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THE VILAYET OF THE ISLANDS OF THE WHITE SEA.*

I.—INTRODUCTION.

JUST as the whole Archipelago of the "Greek" or "White" Sea bears the character of the adjoining continent in its animal and plant life, so the history of the separate islands and groups has always been connected with that of Asia Minor and Greece.

Inhabited in the most ancient times by people of various origin, all the islands of the Mediterranean from Corfu to Cyprus, and from Crete to the Prince's Islands fell at the period of the expansion of the Hellenes as an annex to the great continental possessions which the Greeks had mastered in Southern Europe and in Western Asia. With Greece they passed under the Roman yoke. After the division of the Roman Empire the Archipelago remained to the Emperors of Byzantium till 1185, when the Venetians got possession of a few of the islands. In 1207 the Venetian Marco Sanudo conquered a larger portion of them, and assumed the title of an independent duke. His successors ruled the islands as dukes of Naxos for nearly three centuries, till, in 1556, the twenty-first duke, Crispo, was taken prisoner by Sultan Selim II., when the islands were handed over to the Jew, Michez. He, however, was soon dispossessed, upon which the Archipelago was united to the Ottoman Empire, and remained thenceforward entirely under its control (excepting that the Venetians took temporary possession of a few islands in 1686), until the foundation of the kingdom of Greece, to which the Cyclades, the Northern Sporades, and Skyros were ceded.

The old Hellenes divided the Greek Archipelago into the two main groups of the Cyclades in the west, and the Sporades in the east; but the line of demarcation between these can scarcely be determined, for even Strabo and Pliny, as well as later authorities, reckon a few of the islands now to the one, now to the other group, although in general all the Archipelago, and especially the many small islands along the coasts of Lycia from the gulf of Telmissus to the defile of Mount Climan, were much better known in ancient times than they are at the present day.

In an administrative point of view, after their seizure by the Turks the islands of the Archipelago belonged to the regency of the Kapudan Pasha or Great Admiral, whose office it was to superintend the fleet and to provide for the protection of the coasts. Originally all the Pashaliks, Beyliks, Ziamets, and Timars along the coasts and on the islands of the Osmanli Empire were placed under this regency; towards the end of the 17th century, according to Count Marsiglis (*Stato militare del Imperio Ottomano*), it embraced the Pashaliks of Gallipoli, Caffa,* Trebizond,† and Cyprus‡—that is 27 Beyliks, 217 Zaims, and 2,216 Timariotes, which provided in all 6,336 soldiers.§ The whole revenue amounted to 221,560 Risdales.‖

The residence of the Kapudan-Pasha was first at Rhodes, but he was afterwards represented there by a Serdar, to whom the superintendence of the territory of the White Sea was entrusted.

Before the separation of Greece, in 1830, the Eyalet of the islands, which constituted the domain of the Kapudan Pasha, included also the sanjaks of Negroponte (capital, Euribos), Lepanto (capital, Ainabachit), Morea (capital, Tripolitza), and Mistra, with the islands Naxia and Andro.

In the year 1852, in obedience to the law of the Tanzimat, the Turkish islands were organised into the Vilayet Jezaïri (the islands), with six sanjaks—Rhodus, Bosje Adassi (Tenedos), Limni (Lemnos), Midillü (Mytilene), Sakyss (Chios), and Kybris (Cyprus). The island of Crete already formed an independent vilayet. The present administrative division of the vilayet, which embraces also a portion of the continental land, is shown in the second part of this paper. The numerous partly-uninhabited islets which are not named in official returns, but which from their geographical position belong to the sanjaks of this vilayet, are also noted in the tables in the second part.

* The Vilayet of the Islands of the White Sea (*Bahr i sefid jenairi*), the Privileged Beylik of Samos (*Syssam*) and the Mutessariflik Cyprus (*Kybris*). Statistical and Military Notes from the papers of A. Ritter Zur Helle von Samo, formerly military *attaché* of the Imperial Austro-Hungarian Embassy in Constantinople, published in the *Proceedings of the Geographical Soc. of Vienna.*

* Under the Pasha of Caffa were the Beys of Negroponte, Lepanto, Mytilene, and Sigario.

† Under the Pasha of Trebizond were Batum, Tefterkyayassi, Khoja-Ili, Rhodes, Bigha, Misistra, Chios, Vanakia and Veendo *(sic)*.

‡ Under the Pasha of Cyprus were Deguise, Esner-Tefterdar, Timar-Tefterdar, Karai, Alaj, Tarsus, Sy, Ban, Cerinia, and Menosebeg *(sic)*.

§ According to Ricaut, Salmons, and Van Gach, nine sanjaks belonged to the office of the Kapudan Pasha (Negroponte, Mytilene, Khoja-Ili, Gallipoli, Rhodus, Betgai, Misistra), 124 Zaims, and 1152 Timariotes, which furnished 3544 men.

‖ Sixty aspers, made 1 Risdal (Kara Grush); 270 aspers made 1 German ducat.

The eleven islands (Nicaria, Patmos, Kalymnos, Castelrosso, Nissyros, Symi, Tilos, Stampalia, Scarpanto, Kassos, and Halki), which still bear the old collective name of the "Sporades," had received, by the Imperial firmans of the years 1645, 1685, 1751, 1771, 1772, and by the ordinance of 1860, the privilege of autonomy, governing themselves by representative councils, and paying, in place of the various imposts, only a very insignificant fixed tax (Mahtu). When the introduction of the vilayet law became general, its provisions were extended administratively to these islands also; but the prescribed imposts were not enforced there till the year 1872.

In a military point of view it suffices to glance at a map of the Archipelago to discern what kind of movements would take place in case of war, the choice of important vantage-points being determined by the relative positions of the coasts and islands, by their remarkable arrangement, and by the many obstacles in the way of navigation.

The southern chain of islands of the White Sea, including Cerigo and Crete, appears like a range of detached forts, and thus may be compared to the outmost maritime line of defence of this region, guarding the great cosmopolitan city of Constantinople from attack. On this account it is evident that their possession cannot be a matter of indifference to the Ottoman Government, and it is on that account that its enemies have taken every opportunity of freeing the islands from the supposed oppression of the Turks. In fact, at the present time this natural system of defence is in an ethnographic point of view almost completely—politically also for the most part—in the hands of the Greeks, who are always more or less inimically inclined towards the Porte. Within it the Greek Syra is the most important point, as it is the central station of steam lines uniting the Pyræus, Crete, Smyrna, and Constantinople. How far the region under consideration is prepared for eventual struggles is shown in the military statistics which have been put together in the third part of this paper.

II.—Administrative Divisions, Area, and Population.

Divisions.	Area in Eng. sq. m.	Population.	No. to a sq. m.
A. The Vilayet of the Islands of the White Sea	5621	448,248	79
B. The Privileged Beylik of Samos	212	34,300	160
C. The Independent Mutessariflik of Cyprus	3682	144,000	39

A.—*The Vilayet Bahr i sefid Jezairi.*

The administrative division of the vilayet into the sanjaks of Bigha, Mytilene, Chios, Istanchio, and Rhodus, and its subdivision into kazas and nahies is shown in the table on the facing page, according to the official reports for 1875.

The sanjaks or livas, each of which is under a *Mutessarif* or governor, are divided, according to the vilayet law introduced in the Turkish empire in 1867,* into kazas or kaimakamliks, each of which is governed by a *Kaimakam*, or representative of the governor; the kazas are for the most part again subdivided into nahies or müdirliks.

* Before 1867 the eyalet of the islands included the sanjaks of Kybris, Bosje-Adassi, Midillü, Rodos, Sakyss, Limni, and Istankoi. Syssam (Samos) was a separate kaimakamlik, and the eyalet Creta was divided into the sanjaks of Kania, Canea, Kandia, and Rettymo.

At the head of the Government stands the General-Governor, or *vali*.* As high officials of the vilayet (Erkhiani vilayet) there assist the vali: the chief judge (*Müfetisch i Hükiam*); the *Defterdar*, to whom the financial affairs of the whole province are entrusted; and the chief of the correspondence (*Mektubji*). The other officials directly under the vali, or related to the central Government, through him, are: the *Divan-Reïssi* or *Naïb*; president of the Court of Appellation (*Divan i temjis*); the president of the Commercial Tribunal (*Tidjerat-Reïssi*); the *Alaj Bey*, or Chief of Police, who is at the same time colonel of the gensdarmerie of the vilayet; the *Evkaf-Mudiri*, or comptroller of the properties of the mosques (vakufs); the *Erasi-Mudiri*, or manager of the State possessions; the *Emlak-Reïssi*, or chief of the survey. There is farther, as a rule, a director of public works, an officer for the inspection of trade and agriculture, and a director of the distribution of sums devoted to public use. The tax and customs' officers (*Gümrük*), as well as the quarantine, post, telegraph, and harbour officers, the lighthouse agents, &c., are directly under the control of their central offices in Constantinople.

B.—*The Privileged Beylik Syssam (Samos).*

The privileged beylik of Samos (Syssam Adassi), inhabited almost exclusively by Greek Christians, received administrative autonomy and a Christian governor in consequence of the international conference held at London in 1829 and 1830. At the side of the governor stands four senators, chosen from the population of the island, as a legislative council. The Chamber of Representatives, consisting of twenty-six deputies and the Archbishop, meets every year. Permission to bear a special flag was granted to Samos in 1830, and Dr. Ross (1843) described it as a white Greek cross on a blue field, with a narrow red stripe, which last indicated the dependence upon the Porte. A short time ago (1874) the flag was changed, and now a bicoloured flag, red above, and blue below, the horizontal arms of an upright white cross, is in use.

Samos (Parthenia, Anthemusa, Melamphyllus-Syssam Adassy) was conquered between 888 and 911 by the Saracens, in 1125 by the Venetians: in 1204 it fell to the Franks, and in 1223 Jean Ducas gave the island back to the Byzantine Emperors; it was taken in 1453 by the Turks; in 1550 it was repeopled by the Kapudan Pasha Kylyj Ali, and played an important part in the so-called Greek war of liberation.

When Dr. L. Ross (see his *Journeys in the Greek Islands*, vol. ii.) visited Samos in 1841, Logothetis, who ruled the island during the period of the Greek insurrection, had returned to Athens, where he had taken the position of a colonel in the Greek army. The Bey of Samos at that time was the Fanariote Stefan Bogoridis, who had gained the favour of the Sultan through his loyal conduct in the war of the Porte with Russia, and who had been rewarded with the title of Prince of Samos. According to Dr. Ross (p. 143), the Bey paid a yearly tribute to the Porte

* At the time of the formation of the vilayet of the islands in 1867 (1283) Ahmed Kaisserly Pasha was nominated General-Governor; to him succeeded, in 1872, Nazif Pasha; Omer Fewzi Pasha; and Ibrahim Pasha; in 1876, Sawa Pasha.

Sanjaks.	Kazas.	Nahies.	Area in English sq. miles.	Male Population. Muhammadans.	Male Population. Non-Muhammadans.	Male Population. Total	Islands belonging to the Division, but not named in the Reports.	Has belonged to the Ottoman Empire since
BIGHA	With the capital	Chanak Kala ...		3,302	3,115	6,417		
	...	Ajeabad		1,958	3,219	5,177		
	...	Rankŏi (Erenkoi) ...		...	1,181	1,181		
	Bigha ...	...		2,949	1,465	4,414		
	...	Dematoka		1,305	530	1,835		
	...	Chan	2,779	3,120	218	3,338		
	Lapsaki ...	...		3,960	364	4,324		
	Aiwajik ...	...		7,543	1,056	8,599		
	Eznié (Ineh)	Geikly and Tedid ...		4,260	1,154	5,414		
	...	Bairamitsh		6,182	322	6,504		
	...	Kum Kalá		542	878	1,420		
	Bozje Adassi (Tenedos)	...	11	554	1,461	2,015	Taushan Adassi (Kaninchen I.)	1322, finally in 1657
	...	Imbros I (Imrus) ...	102	..	3,070	3,070		
	...	Samothraki (Semadrek)	76	5	1,084	1,089	... ...	1462
	Limni Adassi (Lemnos)	...	180	916	9,239	10,155	Kasmo	1478, finally in 1657
	...	Bos Baba with Aistrati	13	...	560	560		
		The Island of Thasos is under Egyptian government.						
		Total	3,161	36,606	28,916	65,522		
MIDILLŬ (Mytilene)	Midillŭ ...	With the cap. Midillŭ	...	1,604	11,614	17,718		
	...	Plomar	...	...	7,511	7,511	Kumaki, Sigri.	
	...	Polhenet	...	419	1,030	2,349	Vassitis.	
	...	Yonda (Muskonisia) ...	...	...	1,614	1,614	Eleos.	1462
	...	Yero	...	477	2,340	2,817		
	Molyvo ...	...	...	3,761	5,838	9,599		
	...	Kalonia (Akerona) ...	...	557	2,249	2,806		
		Total	656	6,818	37,596	44,414		
SAKYSS (Chios)	Sákyss ...	With the cap. Chios	361	692	17,786	18,478	Oenussæ, Coni.	
	Ipsara (Psyra)	...	28	...	826	826	Venetiko, Antipsara.	1566
	...	Koyun Adassi (Spalmador)	...	...	268	268		
		Total	389	692	18,880	19,871		
ISTANKŏI (Kos)	...	With the capital Kos	113	836	5,020	5,856	Rigusa, Rachia, Kendeluisa, (Madonna, Panagio).	
	...	Injirli-Adassi (Nisyros)	64	...	2,000	2,000	Tria N. (Sereti), Sofrana (Plaka), Karasi N., Unia N., (Plana), Avga N., Kamila N.	
	...	Astropalea (Pylea)		...	1,300	1,300	Safrani (Adelphoe), Kunupia, Tragonisi (Sondikonisi), Kermenisi, Hagios, Yani (Symai), Tzerni.	
	Kalamios (Kalymnos)	...	47	...	5,000	5,000	Gaidaro, Pharmako, Strongylo, Kunei, Psatho N., Pserimos.	1523
	...	Lerios	23	...	2,500	2,500	Arki, Lipso (Lepsia), Kalavo (Kalopodi), Chalavropa N., Archangelo, Levethia (Labinthos), Mairo, Kinara (Kinaros), Arcti Pharmako (Galairo N.) Telandos, Nera-Nisi, Saphonisi, Kappari.	
	Patmos (Patmos)	...	16	...	2,000	2,000	Amidro, Petro Karavia, Prasonisi.	
	...	Kariot (Nikaria) ...	114	...	5,260	5,260	Furni, Minas, Themina, Antro (Korasiá) Alata.	
		Total	377	836	23,080	23,916		
RHODOS	...	With the cap. Rhodos	559	2,209	1,867	3,876	Limnonia, Makri, Theodoros, Tragusa, Okionia, Pazimada.	
	...	Kastalonia (Kastalos)		441	...	12,441		
	Meis (Megisla Castellorosso)	...	23	120	4,000	4,120		
	Sambeki (Synii)	...	30	...	8,000	8,000	Nethenos, Kiskilleas.	1523
	...	Chergit (Charki) ...	25	...	550	550		
	...	Iliaghy (Episkopi) ...		...	500	500		
	Kashos (Kasos)	...	166	...	11,000	11,000		
	...	Kerpe (Karpathos) ...		...	25,000	25,000	Saria, Armathia, Plati, Stahida.	
		Total	803	2,570	62,917	65,487		
		Total	5,386	47,522	171,389	218,911		
Adding 138 sq. m. and 5,213 inhabitants for Thasos, and 96 sq. m. for the sum of the uninhabited isles.			5,620			224,124		

of 400,000 piastres, while he himself received the tenth of all products of the soil and taxes, so that, after the deduction of the costs of administration, a goodly sum remained over and above. In later years, from 1859 onward, the island was governed by M. Aristarchy Bey, then by Pavlaki Mussurus Bey; from 1873, by Costaki Adossidis Bey. In 1874 the last named was succeeded by Costaki Photiades Bey.

According to the official report, published in the French language, for 1866, the island of Samos is divided into four arrondissements, with twenty-six communes, as follows :—

Arrondissements.	Communes.	Population.	
VATHI	Port de Vathi..	1883	
	Vathi	4091	
	Paleocastro	613	
	Vourliotes	1685	
	Six Quarters	1762	
			10,034
CARLOVASSI ...	N. Carlovassi	2736	
	M. Carlovassi	720	
	V. Carlovassi	591	
	Lecca	1006	
	Castania...	787	
	Sourni	659	
	Platane	836	
	Condeique	273	
	Kondakeos (Condakeique) ...	611	
			8219
MARATHOCAMPO	Calabaktasse.	523	
	Marathocampo	3630	
	Neochori (Esereo)	436	
	Coumeique (Kamarea)... ...	1095	
	Scoureique	395	
			6043
CHORA	Spartarées	645	
	Pagenta (Regonta)	1752	
	Pyrgos	1533	
	Albanais	723	
	Mavraja...	267	
	Chora	1398	
	Mytilinée	3404	
			9722
	Total		33,998

The population figures here given are those of the year 1863.

NOTE.—The number of Muhammadans on the island is estimated at about 300, including the permanent Turkish garrison of two companies of the 4th Infantry Regiment, so that the whole population of the island may now be reckoned at about 34,000.

C.—*The independent Mutessariflik Kybris (Cyprus)*, dates as such from July, 1870; previously it belonged to the vilayet of the islands. The accompanying tabular view of the political divisions and population is taken from Lacroix's description of the island :—

Districts.	Capital Towns.	Population. Muhammadans.	Non-Muhammadans.	Total.
Larnaka	Larnaka ...	3,000	10,000	13,000[1]
Limasol	Limasol ...	2,000	6,500	8,500
Kilassi and Avdimu.	Kilassi ...	800	5,000	5,800
Baffo and Kuklia ...	Ktima ...	4,000	7,000	11,000
Chrysochu	Chrysochu .	1,500	3,500	5,000
Lefka	Lefka ...	2,400	4,600	7,000
Morpha	Morpha ...	1,000	4,500	5,600[2]
Lapita and Kerinia..	Kerinia ...	3,000	5,000	9,000[3]
Ormi and Tillyrgha..	Lithrodonda	600	5,400	6,000
Kytrea	Kytrea ...	2,000	5,500	7,500
Messorea (Messaria)	Vatili ...	2,000	8,000	10,000
Karpas	Famagusta	3,000	5,000	8,200[4]
Nicosia (Lefkosia)...	Nicosia ...	8,000	3,700	12,000[5]
Total		33,300	73,700	108,600[6]

[1] Including 500 Catholics; [2] with 100 Maronites; [3] with 1000 Maronites; [4] with 200 Armenians; [5] with 300 Maronites; [6] with 1400 Maronites and 200 Armenians.

The island of Cyprus (old Gr. Kypros, new Gr. Kypro, Turk. Kybris) on account of its fertility, its riches and its excellent harbours, has been an object of strife from the most ancient times. From the fifteenth century onward Cyprus was in possession of the Venetians; the Turks, under Selim II., conquered it in 1571; in July 1832, Mehemet Ali laid hands on it, and was formally presented with it by the Sultan in 1833; in 1840 it again passed under the direct control of the Porte.

The revenue of the island in 1841 amounted to 3,084,020 piastres, made up from (1), the *Charaj* or *Beledie*, military tax of the Rajah's; (2), the Miri; (3), the *Gümruk;* (4), the dues on the saltworks of Larnaka and Limasol and (5) a tythe on silk and reserved lands.

At the ending of the Venetian rule in 1571 Cyprus is said to have had 860 villages; in 1853, on the other hand, it had only 610, 89 of which were purely Turkish, 6 Maronite, and 515 inhabited by Greeks and Turks. The numbering of the people made in the year 1841, by order of the Governor Talaat Effendi, gave as its result a total sum of from 108,000 to 110,000 inhabitants, of whom 75-76,000 were Greeks, 32-33,000 Turks, 12-13,000 Maronites, 500 Roman Catholics, and 150-160 Armenians. The population of Nikosia was then set down at 12,000, including 8,000 Turks, 3,700 Greeks, 150 Armenians, and about 100 Maronites. According to a consular report of the year 1846, the total population at that time was estimated at 90,000 (55,000 Greeks and 35,000 Muhammadans). Ritter, in 1854, gave 110,000, Synvet (in 1871), 180,000, including 120,000 Greeks, 55,000 Muhammadans, 1250 Maronites, and 500 Europeans. During my stay in Cyprus in the year, 1874, the political divisions of the island were as follows :—

	Kaimakamliks.	Kazas.
Seat of the Mutessarif LEFKOSIA or NIKOSIA.	1. Lefkotsha (Lefkosia.)	Dejermenkoi (Kytrea).
		Dagh Karrassy.
	2. Famagusta (Maussa).	Maussa.
		Messaria (Messorea).
		Karpas.
	3. Tuzla (Larnaka).	Tuzla.
	4. Limasol	Limasol.
		Piskopi (Episkopi).
		Gilan.
	5. Baffo.	Baffo.
		Chrysochon.
		Evdim (Avdimu).
		Kuklia.
	6. Kirne (Kerinia) ...	Kirne.
		Lefka (Lafka).
		Morpha.

The number of the male inhabitants is reckoned by the political staff at 72,000, of which about 50,000 is non-Muhammadan. From this the whole population might be set down at 144,000—44,000 Muhammadans and 100,000 non-Muhammadans.

In an ecclesiastical point of view there are four dioceses for the Rajahs—the archbishopric of Lefkosia and three bishoprics of Larnaka, Kerinia, and Baffo. The clergy of the Christians in Cyprus is said to exceed 1700 persons! The Archbishop of Cyprus is the independent head of the Church in the island, and owes allegiance to no patriarch: with the aid of the three Bishops he regulates the contributions and the school system of the Christians.

III.—Military Statistics.

In the Introduction I have noticed how the geographical grouping of the islands in the Archipelago prescribes the mode of warfare that would be adopted in case of need. The line of Cerigo-Crete-Rhodes in the first place, then the inner island girdle which extends through a width of 70 miles between Greece and Asia Minor, and, lastly, the group of the northern islands would form as many ramparts protecting the entrance to the Dardanelles against attack from the south, if only one will and one intention prevailed throughout them, and if, in consequence of their ethnographic relations and their present political divisions, the greater part of this power had not been already neutralised. As things are, the flanking positions of the islands of Rhodes, Stanchio, Chios, Mytilene, and Tenedos, which directly cover the coast of Asia Minor, alone give some protection. As the relative positions of the islands, the configuration of the coasts, and the practicable trade routes between the numerous dangers of the Archipelago, indicate the most important points for military purposes, so history—and especially that of the Greek war of Independence—shows which of the islands will play the most important parts in future as in former wars.

Like the last redoubts of this extensive natural system of defence lie the *Dardanelles*, about 185 miles from Constantinople. Thus are named the four old Turkish castles which stand in pairs on the European and Asiatic sides of the strait, opposite one another, which now, with newer fortifications, command the passage between the Ægean and the Sea of Marmora.

The south-west entrance of this channel is guarded by the two newer castles of Sedil Bahr and Kum Kalä, 14 miles apart, which were founded in 1659 by Muhammad IV. for protection against the Venetians. Eighteen miles further north-east, almost at the narrowest pass, only 5300 feet apart, stand the old castles of Kilid Bahr and Chanak Kalässi, or Kalä-i-Sultanie, which Muhammad II. caused to be built in 1453, after the conquest of Constantinople. Trusting to the fame of the Dardanelles castles, the Porte, during last century, had allowed them gradually to fall in ruins, so that on the 26th of July 1770 the Russian squadron of three ships of the line and four frigates under Admiral Elphinstone, was able to sail past the first pair of castles in chase of two Turkish men-of-war, without being touched by a single shot, since the Turkish batteries, from want of stores, could only fire once. Warned by this incident, the Porte accepted the offer of Baron Tott to restore the old castles; but the "impregnable" state in which they were placed did not last long, for on the 19th February 1807 the British Admiral Duckworth, with eight ships of the line, four frigates, and several gunboats, accomplished the passage of the Dardanelles without loss, so that on the 20th of February of that year a hostile fleet appeared in view at Constantinople. Previously, as also in the treaty concluded in 1809 between the Porte and England, Great Britain had recognised the principle that at all times ships of war should be forbidden to enter the straits of the Dardanelles and the Black Sea. In 1829 the Dardanelles were closed by a Russian fleet with England's consent, and in 1833, during the Egyptian war, the British and French fleets were not permitted by the Divan to pass, though at the same time, a Russian fleet anchored at Buyukdere.

In a treaty concluded in September 1841, the five Great Powers of Europe gave a fresh promise that no ship of war should be allowed to enter the Dardanelles. At the commencement of the War in the East in June 1853, the British-French fleet anchored south of Kum Kalä in Besika Bay, whence in the end of October its ships passed through the Dardanelles and on the 3rd of November cast anchor in Beikos Bay of the Bosphorus. In the first appendix to the Paris peace treaty of 1856, the agreement of 1841 was in substance confirmed. According to this in time of peace the Dardanelles and the Bosphorus are closed to all but Turkish ships of war; but the Sultan retained the power to grant firmans for the passage of such light vessels as are required on the service of the embassies of foreign powers. The same privilege was reserved for the vessels which the contracting powers, by the terms of the treaty, were empowered to place at the mouths of the Danube; not more than two for each power. After the renunciation of the stipulations of the Paris Treaty by Russia, the prohibition against the passage of non-Turkish ships of war through the strait was further insisted upon by the London Conference of 1870.

All that has been done by the Turkish Government towards preparation for defence in the region of the Archipelago may be summed up as follows:—

1. The erection of a permanent naval station in Crete (since 1869); the fortification of this island; and the construction of the arsenal and port of Suda.

2. The attempt to increase the Muhammadan element in some of the larger islands, partly through various inducements, partly by the settlement of Muhammadans from the possessions in Africa.

3. The formation of new and the improvement of the old fortifications in some prominent points favourable for defence.

4. The increase of the lighting of the coast and of communications—(steam lines, telegraphs, light-houses).

The fortification works in Crete and the construction of the arsenal of Suda were taken in hand in 1869, and have advanced, if very slowly, since that time. The number of ships, which, in the beginning of 1869, was proposed for the Cretan squadron was 28, but in 1874 only 4 or 5 were stationed there.

The introduction of Muhammadans was first attempted in recent years, chiefly of Arabs from Tripoli and Bengazi to Crete; this is as yet too recent an event to enable us to judge of the future influence of this new element. The native Muhammadans of the islands are, with exceptions, the officials, soldiers, and settlers, chiefly renegades of the first or second generation; they are thus distinguishable from the Greeks, whose language they use, only through their newly-adopted religion. On most of the other islands almost all who are not officials or soldiers are Greeks.

The fortifications of the Hellespont may be divided according to their mode of construction into three groups, which correspond to the necessities of the times in which they were built. The remains of the castles of Muhammad II. and of Muhammad IV. are now only of historical interest. On the Asiatic side of the Strait some works were erected at the time of

the attack made by Mehemet Ali, because it was feared that he might attempt to master this important channel. These, as well as the old castles which were partially restored and strengthened at the time of the Crimean war, are characterized by their circular ramparts—low and very strongly-built stone walls with numerous loopholes for heavy guns. To the newest buildings belong the four coast batteries, begun in 1867, under the direction of the former Prussian engineer officer, Blum Pasha, at Naghara, Mejidje, Dejermenburnu, and Namasghiach, which correspond more nearly to the present systems of armament. The former circular forts are being gradually extended into straight earthworks, and their chief strength centres between Naghara and Kilid Bahr.

Most of these batteries are commanded by the heights which rise behind them, and on that account, as was shown in the Reports of the British General Makintosh, of the 6th July and 11th October 1853, some defensive works on the land side across the narrowest part of the isthmus would not be superfluous: for example, at the line about 6 miles N.E. of Gallipoli, where the formation of the ground is favourable for such an outwork. As regards the possibility of a landing being effected from the side of the Bay of Laros, the stationing of one or more ironclads, or the laying of a few torpedoes would suffice to defeat the attempt.

A disadvantage which is at once evident to the visitor in the new batteries is that of the sandy earth of which they are built, and which in spite of the efforts to clothe and bind the slopes with living turf, breaks into ruts and rifts which require perpetual mending. The bases of the works are simple straight walls with loop holes. The armament of the forts and batteries as I found them in June 1874 was as follows:—

Fort *Sedil Bahr* (built by Baron Tott at the time of the Crimean war).

The new battery *Namasghiach* (still in construction), planned for twenty-six guns, contained five iron guns and fourteen newer guns, including one 300-pounder Armstrong.

The old works of *Kilid Bahr* (Izz Kalässi) contained nine large old bronze guns (Kemerliks), for stone shot, and four iron guns (24-36 pounders).

The new battery of *Dejermenburnu* (nearly completed), with stone beds for twelve guns, contained thirteen iron guns and two mortars.

The old fort of *Cham Kalässi*, for fifteen guns—with twelve iron guns and one mortar.

The old fort of *Boyali Kalässi* contained thirty-two guns.

On the Asiatic side:—The old fort *Kum Kalässi* contained thirteen old guns.

The old fort of *Sultanié Kalässi* (a main work with two wings) contained forty-five guns and four mortars.

The new battery *Mejidje* (nearly completed) contained thirteen iron guns and one Armstrong.

The old fort *Köshe Kalä*, for twenty-six guns, contained fifteen iron guns and two old howitzers.

The new battery *Naghara*, planned for fourteen, contained eight guns.

Note.—In all, the fortifications on the Dardanelles contained about 250 older and newer smooth-bore guns, chiefly 24-36 pounders. The calibre of the oldest varied between 1 and 1600 lbs., and the greater number of these were of bronze. The old Kemerliks require a charge of about 150 lbs. of powder: their stone shot, which are said to have a range of from 2 to 3 nautical miles, have a diameter of 2 ft. 9 in.

At the time of Count Moltke's visit to the Dardanelles (1836) there were 580 old guns in the fortifications. A large number of these have since that time been sent to Constantinople to be recast.

Two Armstrong guns, one of which stands in the Namasghiach battery, the other in that of Mejidje, were exchanged by the English government for two antique Kemerlik guns. The works of a newly-projected battery south of Sultanié Kalässi have been stopped for the present on account of the deficiency of suitable soil.

At the outbreak of the Russo-Turkish war, in April 1877, the fortification works were said to be completed, and a large number of the old guns had been replaced by new Krupp's. A new battery had also been built on the *Punta dei barbarei*, and forts Kumkalä and Sedil Bahr had been renovated.

On the larger of the islands in the Turkish Archipelago there are still a number of old works, castles, and blockhouses (pyrgo), the most of which were built by the Venetians, and which are only of military importance in view of possible insurrectionary disturbances.

As a permanent garrison for the above-mentioned fortifications of the Dardanelles there are two foot-artillery regiments, Nos. 1 and 2, the first for the Asiatic, the second for the European side of the channel.

Besides this there are in Chanak Kalä a *fortification commission*, consisting of 1 colonel, 1 vice-major, &c., a *military works' commission*, an *intendance division*, and lastly a *Sanaï Tabur* or battalion of artizans, the workers in a small supplementary arsenal to that of Tophane in the fortification itself, for preparation of ammunition, repairs, &c. The military medical staff in Chanak Kalä consists of 1 lieutenant-colonel, 1 major, 3 apothecaries, and 1 surgeon. Besides the first artillery regiments there is another foot-artillery division, the distribution of which over the islands of the White Sea and in Cyprus is as shown in the following table:—

Foot Artillery—Division of	Companies.	Distribution.
Tenedos	2	Tenedos, 1 company. Lemnos, 1 ,,
Mytilene	2	Mytilene, 1 ,, Molyvo, half company. Ligri Baba Kalä, 1 sub. and 6-8 men.
Chios	3	Chios, 2 companies. Yenikalä Ligadik. Cheschme, 1 com. (in Vilayet Aïdin)
Istankŏi	2	Istankŏi, 2 companies. Budrun (1 sub. and 5-6 men).
Rhodus	3	Rhodus, 3 companies.
Cyprus (Lefkosia) ...	2	Lefkosia, 2 ,,
Cyprus (Tuzla) ...	2	Larnaka. Limasol. Famagusta Kerinia

The command of the whole of the fort garrisons of this region, to which Crete (with 3 divisions of 2 companies) and Tripoli, in Africa, belong, is vested in a colonel whose head-quarters are at Chanak Kalä, under whom are an Alaj-Emini (regimental chief), and an Alaj Kyatib (regimental secretary). Lieut.-colonels are stationed at Mytilene, Cyprus (Lefkosia),

and in Crete (Canea). Both the fort regiments of the Dardanelles and the fort division of the islands above noted, are under control of a Ferik Pasha, or Divisional General, resident at Kalä Sultanié. In consequence of the resolution in 1874 to increase the army recruiting district, the inhabitants of the coast-lands, formerly reserved for the supply of the marine, were formed into Redif regiments and battalions; and besides three new regiments "of the Black Sea" a new regiment of the Dardanelles was raised and placed as the 7th Redif-regiment of the I. Ordus. The staff of this regiment has its head-quarters at Kalä Sultanié.

To the military region of the Archipelago must be added the Gulf of Smyrna and the old fortifications of Yenikalä, Cheschme, Skalanova, Sigajik, which since 1870-71 have been destined to be gradually abandoned. Eski and Yeni Fotsha were abandoned in 1871, and the old guns of these places were carried to Constantinople.

Smyrna is garrisoned by the staff of the 5th Redif regiment of the III. Ordus. 1 battalion of the 6th Infantry regiment, of the I. Ordus, and half a battalion of the 4th Infantry regiment of the I. Ordus: the other half of this battalion is stationed in Samos (2 companies), Chios (1 company), and Aivali (1 company) detached.

Navy.—Of the Turkish Navy there are in the Dardanelles, in Smyrna, and the harbours of the larger islands permanent naval stations as follows, (June 1874):—

In the Dardanelles, the steamer			'Kandia.'
In the harbour of	Smyrna,	the sailing-frigate	'Ertogrul.'
,, ,,	Mytilene,	the S.s.	'Esser i Nuzhet.'
,, ,,	Chios,	,,	'Seijar.'
,, ,,	Samos,	,,	'Istankŏi.'
,, ,,	Istankŏi,	,,	'Ainaly Kavak.'
,, ,,	Rhodus,	,,	'Muhassil.'

Farther there are 4 steam-dredgers, one of which is in Mytilene, one in Smyrna, one in the Dardanelles, and one in Chios, for the cleansing of the port. Within the space included between the four new forts of the Dardanelles there lies a small war vessel, the 'Nuvaid i Futah,' for the revision of the firmans of the ships coming from Constantinople.

IV.—COMMUNICATIONS.

In a military point of view the most important lines of communication in the region of the Archipelago coincide with the routes of ordinary maritime traffic, and to these they must conform still more closely as the terminal points of railways from the interior increase in numbers on the coasts. Whilst the local traffic between the numerous islands has remained almost a monopoly of their own trading vessels, the steam lines of several great companies lead through the White Sea, and touch also, in their passage to the central points of trade in the East, at the most important intermediate points on the coasts and islands. Among these companies the Austrian Lloyd's has hitherto held the first rank, in spite of the concurrence of the French *Messageries*, the Russian *Compagnie de Commerce et de Navigation*, the Italian *Trinacria*, the Turkish *Azizié* (from 1878 *Mahsussé*), and the Egyptian *Khedive* Company, besides the English steamers, which, indeed, provide the largest contingent for the transport of the immense quantities of grain brought from the harbours of the Black Sea. Besides the regular routes of the great company lines, an English steamer goes every fourteen days from Smyrna to Adalia, touching at all the larger Turkish islands and coast towns. The traffic in the Gulf of Smyrna, between the city and Vurla and Buja, is provided for by two small local steamers.

The Turkish naval marine maintains, as aforesaid, several vessels in the Dardanelles, in the gulf of Smyrna, and at the islands of Mytilene, Chios, Samos, Istankŏi, and Rhodus, as station ships; whilst Crete, with its arsenal and naval port of Suda, has been the central station of the Mediterranean squadron since 1869. (The existing and projected lighthouses as well as the telegraph lines are indicated on the accompanying map.) Land communication in the interior of the islands is almost exclusively confined to that which is afforded by beasts of burden; as such the mules of Cyprus and of Crete are famed, just as are the ponies of Crete and Mytilene. In Cyprus many camels are also employed.

THE COUNTRY OF THE WHITE HORDE OF KIPCHAK.

IN writing the second volume of my *History of the Mongols*, which deals with the very complicated history of the Golden Horde, and the various fragments into which it broke up, such as Krim, Astrakhan, Kazan, the Kirghiz Kazaks, the Uzbegs, the Nogays, &c., and which is now passing through the press, I have had to examine with some care the topography of some difficult regions. Among them perhaps the most difficult is the land occupied by the White Horde, which was ruled by the senior line of the house of Juchi Khan, and occupied the country east of the Karakum sands. I venture to think that an examination of this area may interest some of the readers of the *Geographical Magazine*.

The country occupied by the White Horde is certainly one of the least-known parts of Asia. Once dotted with flourishing settlements, these have long since for the most part disappeared, and are now marked merely by ruins or mounds. As the country has been little explored, we can only in a few cases fix the sites of these old settlements.

It would seem that the land of the White Horde was conterminous largely with that occupied by the Oghuz Turks of the Arab writers. Thus it included the Lower Jaxartes and the valley through which it flows, the western part of the Alexandrofski range, the valley of the Sarisu, the Ulugh Tagh and Kuchuk Tagh mountains, and the present camping ground of the Middle Horde of the Kirghiz Kazaks. Its boundary on the east, where it was conterminous with the Khanate of Jagatai, is very uncertain. Von Hammer enumerates Sighnak Otrar and Taras as its chief towns (*Golden Horde*, 329), and we find that in Ssanang, Setzen the Golden Horde is spoken of as the Khanate of Togmak, which name it doubtless derived from the town of Togmak, on the Chu. This seems to show, what is otherwise probable, that it included all the valley of the Chu, a famous river, which loses itself after a considerable flow in the sands of Karakum.

On the north it was apparently limited by the Khanate of Sheiban, on the west by the Horde of Batu, on

the south-east by the Alexandrofski mountains, and on the south-west by the deserts of Kizil Kum, which separated it from Khuarezm. As I have said, this country is at present singularly unexplored. Once it was no doubt a very thriving region. We have reason to believe that the Chu once rose in lake Issikul and flowed into the Caspian, and that the Talas and the Sari-Su were its tributaries. Its banks were thickly peopled, and its borders irrigated with artificial canals. It was traversed too by the great highway which in Mongol times connected the east and west, and was then much frequented. We can only throw a partial light on the topographical riddles that meet us here at every turn. First let us consider this trade route.

The problem of tracing out some of the vaguely-described journeys of ancient travellers is much facilitated by certain physical features, which limit our hypotheses very considerably. Oceans cannot be crossed without ships, nor huge mountain ranges by large armies except at certain passes. This is familiar enough, but it is hardly as familiar that deserts are almost as impassable as oceans, and that we cannot therefore hypothecate a direct march from one point to another unless we know the nature of the intervening country. It is the necessity of avoiding physical barriers that makes ancient trade routes in the east so persistent, perhaps more persistent than any human institutions.

The great trade route from China to Persia, which was traversed by Chinese as well as Western travellers led by all accounts along the northern slopes of the Alexandrofski range, along the road which still remains the only route from Togmak to Avlie Ata. It is well delineated in Colonel Walker's capital maps of Central Asia. In traversing this district it crosses the very numerous head streams of the Chu, which spread out like a fan and form the well-known Mingbulak or the thousand springs to which I shall presently refer. Between Togmak and Avlie Ata its course is pretty nearly east and west, and it is bounded on the south by the impenetrable Alexandrofski mountains.

At Avlie Ata the mountain range is broken by a gorge, through which flows the river Talas or Taras. This gorge forms one of the most important passes in the world, the pass which connects Iran and Turan, and by which it is probable that many of the earlier nomadic invaders of Persia entered the valley of the Jaxartes. This important site, now marked by the town of Avlie Ata, was formerly the meeting place of two distinct trade routes. One of these has been almost discontinued, and formerly led westwards along the northern slopes of the mountains towards the sea of Aral. The Uzbegs and other nomades have swept away its towns and made it otherwise impracticable. The other route is still frequented and goes through the gorge to the south-west to Chimkend.

From the fact of two great roads meeting there, and from the fact also of its being the only feasible trade route across the mountains, the gorge I have referred to must always have been a very important station, and it is, I believe, universally held now, that in former times it was commanded by the town of Taras, and that Taras occupied a site not far from the modern Avlie Ata. "Avlie Ata owes its name," says Mr. Schuyler, "to the tomb of the patron saint of the Kirghiz Avlie Ata, holy father, said to have been a certain Kara Khan, and a descendant of the Sheikh Ahmed Yasavi, who is buried at Turkestan. The tomb itself, which is an ordinary brick building, is in a woful state of dilapidation, and is by no means as interesting as the similar monument erected over the grave of Assa bibi, some female relation of Kara Khan, which can be seen on the road side 10 miles west of the town. Ten miles below Avlie Ata on the Talas, amidst the sands of the Muyun kum, are the ruins of what was apparently a city, called by the natives 'Tiume Kent,'" which the author adds "may perhaps prove to be those of the city of Talas." Tradition says that a maiden once lived there who was beloved by the prince of the Divs, giant spirits who dwelt in the neighbouring mountains. In order to prepare a fit residence for her, this Div began to build a city, and for that purpose threw down immense stones from the mountains of Makbal. The city was never finished, but its remains are still visible, called by the natives Akhyrtash (Akhyrtepé) or Tashkurgan. The legend may be absurd, but the ruins, which are about 30 miles east of Avlie Ata, * are very curious. They consist of an immense unfinished building 600 feet by 450 feet of reddish sandstone, the lower layers of the front being built of large stones 7 feet long by 4 feet broad. M. Lerch, who investigated the ruin, thinks it was intended for a Buddhist monastery. The scattered stones are supposed by the natives to have been mangers, or feeding troughs for an encampment, and hence the name Akhyrtash, stone manger. The Chinese traveller, Chang Chun, who passed here in 1221, says, "We travelled westwards along the hills, and after seven or eight days' journey the mountains suddenly turned to the south. We saw a city built of red stone, and there are the traces of an ancient encampment. To the west we saw great grave mounds placed like the stars in the Great Bear." These mounds also still exist, and from a short distance they indeed appear to be seven, disposed like the seven stars of the Great Bear. In reality, however, there are 16 mounds of different sizes, the largest being from 200 to 250 paces in circumference. They are called by the Kirghiz, Jitte tepé, or the seven mounds. On one of them M. Lerch found a stone bearing a Manchu inscription, relative to a victory of the Chinese over the Sungars, in 1758 (Schuyler's *Turkestan* ii., 121-122).

Having shown that there are abundant ruins to satisfy those who wish to have tangible proof of the former existence in this neighbourhood of a large city, we will now pass on to collect such notices of it as we can find.

It is probably one of the oldest sites in the world. Edrisi writes the name Taran, and I would suggest as possible that the name Turan, the complement of Iran, is connected with it, for Taras commands the main pass which leads from Iran into Central Asia. It first occurs in the pages of Menander Protector who wrote towards the end of the 6th century, and who, in describing the embassy of Zemarchus to the Turkish Khan Dizabulus, in the year 569, tells us that while the Khan was engaged in an expedition against the Russians, and while his camp was pitched at a place

* He says above they are 10 miles below Avlie Ata, and perhaps a different set of ruins is here meant.

called *Talas* an ambassador from the Persians went to meet Dizabulus, who invited him to dinner, as well as the ambassador of the Romans (*Cathay, and the Way Thither*, clxv).

About the year 629 Hiuen Thsang, the famous Chinese pilgrim passed through Taras. He tells us "that about 400 *li* west of the Su ye (*i.e.* the Chu) he arrived at Thsien-thsiuen (*i.e.* the thousand springs answering to the Mingbulak of the Mongols). The country of Thsien-thsiuen was about 200 *li* square. On the south it was bounded by snowy mountains, and on three other sides by continuous plains. The land was well watered, and the vegetation abundant. . . . . The Turkish Khan went there every year to pass the summer heats. After travelling about 140 or 150 *li* to the west of Thsien-thsiuen he arrived at the town of Ta-lo-si" (Vivien St. Martin, *Memoir on Hiuen Thsangs' Travels* 18).

The thousand sources called Thsien-thsiuen or Ping-yu by the Chinese, Mingbulak by the Monguls, and Pingul by the Turks, is a name occurring in several places, and meaning in effect a well-watered country. *This* Mingbulak, which was bounded on the south by snowy mountains, was doubtless the district watered by the cluster of small rivers and torrents which form the head waters of the Chu, and the Ta-lo-ze of the Buddhist traveller is no doubt Taras. In the Tang-shu or history of the Tang dynasty under the article Shi (*i.e.* Jash or Tashkend) we read of Ta-lo-sze as a city situated west of theriver Sui-ye (*i.e.* the Chu)—(Bretschneider, *Notes on Mediæval Geography, &c.*, note 59.)

In the travels of Chang Chun, who visited Western Asia in 1221, and whose narrative is very confused, he mentions that four days after leaving Almaligh he arrived at the river Talasu Molien (*i.e.* the Talas Muren) a river which is described as deep and broad, coming from the east and cutting across the Yin Shan mountains, and running in a north-western direction. To the south of the river were snow-covered mountains (Bretsch. *Notes on Med. Travellers, &c.*, note 34.) In the Si-shi-ki, describing Shang-tis' journey westwards in 1259, he tells us that he passed Ta-la-sze without mentioning whether it was a river or a town (*id.* 75). In the Si-yu-lu we are told that several hundred *li* to the west of Hu-sze Wo-lu-do, the capital of Kara Khitai, was the city of Ta-la-sze, which last town was 400 *li* from K'u-jan, *i.e.* Khojend (*id.* 114 and 115). All these references point to one conclusion only, namely, to the Ta-lo-sze of the Chinese being the city of Taras or Tatas, identified with Avlie Ata.

Let us now turn to the Western authorities. Edrisi calls Taras, Taran. He says it was a place of passage for the Mussulmans who had established fortifications there against the Turks, for he says the country to the north was occupied by the Khizilji Turks, with whom the Mussulmans were for the most part at war. When there was peace between them then there was an exchange of commodities in merchandise, cattle, furs, &c. (*Edrisi ed. Jaubert* ii., 208 and 209). This answers surely exactly to the frontier town of Avlie Ata, but the fact is made certain when we examine the route which he gives from Samarkand to Taran, which we can trace step by step to Isfidjab, now called Chimkend, whence it was three days' journey to Taran with one intervening station at Badakhkath, between which and Taran was a wild country without inhabitants or cultivation (*id.* 214).

In a work quoted by Quatremere as the *Mesalek alabsar fi memalek alamsar*, whose author was born in the year 700 and died in 749 *Hej.*, we are told it was twenty days' march from Samarkand to Yanghi, and that Yanghi consisted of four towns, separated from each other by a distance of a parasang each. They all had distinct names, and were known as Yanghi, Yanghi-baligh, Kenjek, and Talas (Quatremere, *Notices et Extraits*, xiii., 224-226).

In the *Tarekhi Rashidi* we read that Taraz was called Yanghi by the Mongols, and that there were many people of Yanghi in Mavera-un-nehr who were called Yangilik. In the steppe of Yangi, says its author are found the ruins of several cities, and of domes, minarets, and schools; but, he adds, it is not known which of these ancient cities was Yanghi, or what were the names of the others (Veliaminof Zernof, *Hist. of the Khans of Kasimof* ii., 156).

In the Geography of Keft Iklim we are told that Taraz was formerly a celebrated town, now destroyed by the Uzbegs. Its environs, to which the name of Taraz was given, were desert (Quatremere, *loc cit.*).

Baber and the Akbar Nameh confuse Yanghi and Otrar; and Klaproth, and others among modern writers, have confused it with Yassy or Turkestan.

Having fixed the site of Taras, let us now proceed further. There is a passage in the history of the Kara Khitai which has not hitherto been rightly explained. We are told that after the Gurkhan had conquered the country which he ruled over, he appointed governors from Kum-kidjik—*i.e.* the desert of Kipchak to Barsendjan, and from Taras to Tanidj, *i.e.* to Tamghadj or Taugas, answering to Uighuristan.

Barsendjan has been a puzzle to most inquirers. Dr. Bretschneider says that Du Halde, in the map of China appended to his *History of China*, in 1734, places "Bersajean la haute" or Sairam, on the River Talas (*op. cit.*, 37). This name of Sairam, or Kara Sairam, reminds us that Mikhond associates it with Taras, and tells us it was a vast town, a day's journey from end to end, having forty gates, and inhabited by Mussulmans, and that it belonged to Kaidu (*Notices et Extraits*). On turning to Edrisi, we find him mentioning two Bersedjans—Upper Bersedjan, remote from the neighbourhood we are describing, and Lower Bersedjan, a town surrounded with inhabitants and cultivated fields, and 33 miles from Taran or Taras (*op. cit.*, ii., 217). Again, in reporting the famous voyage made by the Arab Salam among the Turks in the ninth century, he tells us that in returning homewards from the East he came by way of Gharian, Bersadjan, and Taran to Samarkand (*id.* ii., 420). These extracts seem to show that Bersadjan was situated on the grand route to the East, some 33 miles from Taran, which agrees very well with the site of the ruin of red stones mentioned by Mr. Schuyler, which he tells us was 30 miles east of Avlie Ata, and which he seems to have confused with other ruins some 10 miles further down the Talas than Avlie Ata, as I have mentioned.

On journeying eastwards from Taras the first really important place met with is the fort of Togmak, on the Chu. Mr. Schuyler says "The old town of Togmak, of which now only almost undistinguishable ruins remain, was about 15 miles above the present one, which is a small place with a Russian population of 300, and is on the site of a Khokandian fort, cap-

tured in 1860 (*id.* 126). Togmak must have been of great importance in mediæval times, for it gave a name to the Khanate of Kipchak. The name Togmak, as Dr. Schmidt says, was used by the Mongols to designate the Khanate of Kipchak. Ssanang Setzen, whose geography is not very clear, applies the name also to the empire of Khuarezm (*op. cit.* 87 and 383, note 41). He calls Juchi "Khan of Togmak" (*id.* iii.), and speaks of the ruler of Togmak, in 1452 as a descendant of Juchi (*id.* 165).

Abdul Razzak, in describing Timur's campaign in 1391, calls the people of Kipchak Togmaks, and after their victory the soldiers of Timur sang a song, in which they boasted of being the vanquishers of the Togmaks.

Rubruquis on his journey towards Karakorum travelled southwards for eight days from certain Alps or mountains, which were doubtless the Urtagh chain and its shoulders, arrived at a well-watered and cultivated plain, bounded on the south by high mountains, and entered a town which the Saracens (*i.e.* the Muhammadans) called Kenchak, and which was watered by a large river which sprang in the mountains and was lost eventually in the sands, and which was six days' journey from Talas. Mr. Schuyler has identified Kenchak with Merke, and I formerly followed him in so doing, but I am now convinced that Togmak must have been the town otherwise called Kenchak. The distance from Taras as given by Rubruquis suits it better than Merke, where Mr. Schuyler puts it, and it is further the converging point of the trade route along the north of the mountains, and that east of the River Chu, which latter seems to have been followed by Rubruquis.

Taras and Kenchak are associated together several times by the Persian writers. Thus Rashd ud din speaks of the meadows of Talas and Kenchak, and Haidar Razi talks of "the meadows of Talas and Kenchak which are commonly called Meski and Taraz." The two towns were at each end of the well-watered track of Mingbulak, and the whole district is thus well described by its limiting towns.

Kenchak was apparently a new name given to the town after the Mongol conquest, for I do not meet with it before. It seems to mark the site of the famous capital of the Kara Khitai, Balasaghun, which has been the subject of much controversy.

Having examined the topography of the country east of Taras, let us now turn to that west of that city. Here unfortunately we have but scant information. The road followed by nearly all travellers was through the gorge at Avlie Ata, and down upon the Jaxartes by Chimkent, a route which is well known. For information as to the road westward along the northern flanks of the Alexandrofski range, we are, in fact, limited to one writer, namely, the Armenian royal traveller, Haithon. He went to visit Mangu, and travelled from Cilicia by way of the Kipchak. It would seem that it was his intention to return by the same route. When he, therefore, reached Taras on his way home, and had there had an interview with Khulagu, he tells us he turned to the north-west, and came successively to Kutukchin, Berkent, and Sukulkhan, none of which places are apparently named elsewhere, but they were doubtless on the main route from Avlie Ata to Suzak. They then reached Urusokan. Ur is a particle occurring in many Turkish names, as Ur-tepe, Ur-tagh, &c., and simply means high. Usokan is assuredly but a form of Uzkend. Uzkend was one of the cities captured by Juchi, as I have mentioned, and I have also shown that this Uzkend was not the Uzkend on the eastern limits of Ferghanah, but was situated much further west. It is not at all improbable that it was the same place which Haithon calls Urusokan.

Let us follow his further steps. After leaving the latter places he passes Kayikent(?) and then arrived at Khuzak. This is identified by Mr. Schuyler with great probability with Suzak, a well-known town marked on Colonel Walker's map, and mentioned in the account of M. Nazarof's journey to Tashkend in 1813. He reached it after crossing the Chu, and traversing some lands beyond (Levchine Kirghiz Kazaks, 104). After leaving Suzak our traveller passed successively Kamotz, Khandakhuir and Sighnak.

Sighnak was a famous town, the capital of the White Horde, and it is curious that its site should be quite unknown. Haithon, in speaking of it, says "there is the mount Kharchuk whence the Seljuks came and where mount Thoras begins." The mountains of Karachuk were no doubt the range in which the river Kara Ichuk, a tributary of the Jaxartes springs. Klaproth says Sighnak was situated on the Muskan, a tributary on the right of the Jaxartes, which had its origin in the Kharchuk mountains (*Nouv. Journ. Asiat.*, 285 note). He does not cite his authority, but this position is in itself probable. Sherifuddin speaks of Sabran and Sighnak as the two frontier towns of Turkestan, and tells us Sighnak was situated twenty-four miles from Otrar, while a biographical work, cited by Von Hammer, speaks of it as being near the town of Yassy (Von Hammer *Golden Horde*, 11 note). Vambery, I know not on what authority, says it was united to Jend by a canal (*Hist. of Bukhara*, 124). These various hints point to the neighbourhood of Babai Kurgan (which is named on Colonel Walker's map) as the most likely site for the capital of the White Horde. It would therefore seem that Haithon on leaving Suzak crossed the mountains by the Bikpik pass and went to Sighnak. Thence he retraced his steps again to pay a visit to Sertak, who was on his way to Mangu Khan. After which he returned to Sighnak, and thence went on to Sabran, which he tells us was extremely large. Sabran is a well-known site on the main route from Yanghi Kent, to Turkestan, and is marked on Colonel Walker's map.

Edrisi says that Sabran was a town where the Ghuz met to make peace or a truce and to trade in times of peace. He tells us it depended on Nukath, the capital of Ilak (*op. cit.* 207). In another place he tells us that after passing Sabran one enters the desert of the Ghuz (*id.* 209). Its site was passed by Schuyler a little above the Russian fort of Julek. He says its ruins lay some distance from the post station, so that he could not visit them. "They were noted a few years ago for containing two tall brick towers or minarets of very graceful construction, having spiral staircases within; one of them fell a few years ago, and as the other was also greatly injured by the Kirghiz it is now also probably in ruins."

From Sabran, Haithon went to Kharchuk, situated doubtless on the river of the same name flowing

between Sabran and Turkestan, and then went on to Yason, *i.e.* Yassy, the old name for the town of Turkestan, recently visited by Mr. Schuyler, From Yason our traveller went on to Savri, which is probably to be identified with the ruins north of the river Aris, marked on Colonel Walker's map. The next station he reached was the famous Otrar whose ruins are still to be seen a little to the north of the river Aris. It was a famous city in early times, and I have elsewhere described how the truculence of its governor led to the invasion of the Khuarezmian empire by Jingis Khan, and how his people wreaked their vengeance upon it. It was also at Otrar that the great Timur died. It first appears under the name of Otrar in the 13th century and was previously known as Farab. It is mentioned by Ishtakhir (Ouseley's *ed. passim*) and seems to have been the capital of a small territory, a position which it retained after its change of name, for in the Chinese account of the travels of Yelu Chutsai (Bretschn. *Notes on Med. Trav. &c.*, 115) we are told ten other cities were dependent on it. In Pegolotti's land routes to Cathay, compiled in the first half of the 14th century, we are told Ottrarri was 45 days' journey with packasses from Almaligh, while it was a journey of 35 or 40 days with camel waggons from Urgendj (*Cathay, and the Way Thither*, 288). As Colonel Yule says, Ortrar was the great frontier city between the Khanates of Kipchak and Jagatai, and we find it with the other towns of the White Horde assigned as the appanage of Toktamish by his patron Timur.

On leaving Otrar, Haithon crossed the Jaxartes and went on by way of Zernuk whose ruins are marked in several maps on the left of the Jaxartes, and Jizakh, which still retains its name, and so on to Samarkand.

We have not completed our survey of the towns of the White Horde, and still have to consider those which were to the west of Sighnak. In speaking of the mountains of Kharchuk, Haithon says they began with the Taurus and reached to Parchin. This will be recognised as the name of a mint-place of the Golden Horde.

Among the towns captured by Juchi in his first campaign was Barchin, otherwise called Barkhalykent. It is called Bar-jen in the Yuan Shi, and Bar-chilikan in the Chinese map published by Dr. Bretschneider (*Notices of Med. Geography*, 193 *et passim*). It is also mentioned by Carpini under the name Barchin (*op. cit.*).

These are all the notices of this town known to me, and it seems to have been situated at the western termination of the long chain of mountains known now as the Alexandrofski range, where all accounts agree that the country is strewn with ruins as yet unexplored. Between this point and Suzak is the station of Aksumbe, marking, no doubt, one of Timur's halting places on his journey towards the Urtagh and which he calls Ak Saman.

Let us now examine the towns on the Lower Jaxartes. Of these the most important in every way was Yanghi Kent. Yanghi Kent simply means new town, a name which is in some measure misleading since it is mentioned in early days. Mr. Erskine tells us it is the Alkariah al Jadideh of the Arabs (Baber, 11 note 6). It is mentioned by Masudi, under the name of Haditse, *i.e.* "the New" and he tells us it was situated a fersenkh from the Sihun or Jaxartes, and two days' journey from its outfall into the lake of Khuarezm. He tells us further it was the chief winter residence of the ruler of the Oghuz Turks (D'Ohsson Abul Cassim, 147). Edrisi in describing the course of the Sihun or Jaxartes tells us that after passing Sabran it entered the desert of the Ghuz, and passed at a distance of three miles from the town of Ghozzia the New, and then fell into the lake of Khuarezm at two days' journey from that town. He tells us this town was the capital of the Ghuz and the winter residence of their ruler, and that Mussulmans were found there. It was twelve days' journey from Khuarezm and twenty from Farab or Otrar (*op. cit., ed. Jaubert*, 209 and 210).

Carpini mentions the town under the name Janckint. Abulfeda tells us Yanghi Kent was situated on a river which fell into the lake of Khuarezm. It was 10 days' journey, he says, from Urgenj; 20 from Otrar; 25 from Bukhara (*Davezac op. cit.* 513, note 2).

Levchine tells us its ruins are situated at a distance of an hour's ride on horseback from the Syr or Jaxartes, and a day's journey from its mouth. In the last century it belonged to the Karakalpaks. Gladychef, who was sent on a mission to these people in 1742, found the town then in ruins, but its ramparts and towers still remained, and the Khan of the Karakalpaks lived inside the enclosure. It was afterwards occupied by the Kirghiz Kazaks, who reported that its primitive inhabitants had been driven away by serpents (*op. cit.* 114).

M. Lerch explored the ruins of Yanghi Kent in 1867. He opened several of the mounds and found various articles of pottery and household ware, but nothing which could enable the age of the ruins to be ascertained (Schuyler *op. cit.* 68 and 401).

It would be a great boon to students if Mr. Michell or some other Russian scholar would translate this tract of M. Lerch, on the Archæology of Turkestan, and I fancy it would be very welcome to the subscribers to the *Geographical Magazine*, if its most Catholic editor would find a corner for it.

Another town of the Lower Jaxartes which was captured by the army of Juchi Khan, and which occurs frequently in Eastern history, is Jend or Jund. I have no doubt it is the Kojend of Edrisi (not to be confounded of course with his Khojend further east). He mentions it as one of the three cities of the Ghuz on the Lower Jaxartes (*op. cit.* ii., 209). Masudi expressly calls it Jend in a passage which was probably copied by Edrisi (D'Ohsson *op. cit.* 14). It is very probable that the name of Lemfinc, a town mentioned in this neighbourhood by Carpini is a blundered legend for Jend. M. Lerch, who has studied the archæology of Turkestan so diligently, fixes the site of Jend at some ruins on the right bank of the Jaxartes between the fort of Kazalinsk and that known as number 2. Of this famous city where the founder of the family of the Seljuki went over to Islam and died, there only remain some mounds of rubbish and tombstones with Arabic inscriptions. Bricks have been largely used by the modern Kazaks to build their mausoleums with (*Russiche Revue* i. 31). I may add that the third town of the Ghuz on the Jaxartes is called Khuara by Maendi. The name is written Hawara in the translation of Edrisi.

H. H. HOWORTH.

ORIGIN OF THE ORDNANCE TRIGONOMETRICAL SURVEY.

IN our numbers for February and June 1873, we gave a series of articles by Captain Palmer, R.E., containing a history of the progress and modes of procedure of the Ordnance Survey, which was afterwards published in a separate form by Mr. Stanford. The following paper treats of the origin of the Ordnance Survey, and relates some events connected with its early history which were not referred to in the same detail in the previous articles on this subject, and which will be interesting to geographers.

After nearly a century from the time of its practical inauguration, the Ordnance Trigonometrical Survey is drawing to a close. Hitherto the public notices of its origin and progress have been more or less fragmentary, as the annual reports of the superintendents have been presented to Parliament. These necessarily briefly relate to the financial and field operations of the preceding year. A consecutive narrative of its interesting annals from the period of their inception has yet to be written. Meanwhile, a few passages of the more salient points in its history may be appropriate at the present day.

From the last report issued by Lieut.-General Cameron, Director-General of the Survey, we learn that—"The field survey of Scotland having been completed before the end of the year 1877, the whole force of field surveyors in Great Britain is now concentrated in England." This implies that the trigonometrical mensuration of North Britain and Ireland is finished, and it only remains to measure certain English counties in order to complete the cadastral survey of the United Kingdom. So far that is correct; but in a scientific, topographical point of view, concerning the primary and secondary triangulations, which form the fundamental basis of this great national survey, it is now virtually completed. England was the first of the three kingdoms measured and mapped by the Ordnance surveyors, during the latter part of the last century and the first decade of the present. But these were published on the limited scale of one inch to a mile, after being plotted by the draftsmen on a two-inch scale. Therefore, although England is apparently last in the field of operations, she was in reality the first.

When the English county maps on the one-inch scale were published, the authorities and the public considered them excellent and suitable for all practical purposes. At the beginning of this century the survey was no longer confined to purely abstract theories, or military strategical plans, which engrossed the attention of the Board of Ordnance previously. All classes of the community became more or less interested in the accurate delineation of their native land, and the new maps on the one-inch scale were eagerly sought after. Townspeople looked forward to the issue of correct plans of their boroughs from the Topographical Map Office in the Tower of London, with keen interest, to see the proper disposition of the thoroughfares and buildings. Country folks, both landed proprietors and tenants, examined the county maps carefully to trace their boundaries, and those of estates and farms. Incumbents of church property scanned the limits laid down of their benefices with jealous eyes. Parochial authorities were equally watchful of parish bounds, so that there should be no encroachments of their limits. Political parties in Parliament contended with each other to see that the divisions of counties and boroughs were not altered to the detriment of constituencies. In fine it was seen that the new system of surveying and mapping accurately under the auspices of Government, would ere long make a revolution by peaceful progress throughout the social, political, and municipal institutions of the realm. And so it has done, increasing the importance of the survey from year to year, until the original one-inch scale was found insufficient for the correct minute valuation of lands for fiscal and like purposes, and a scale of six inches to a mile was sanctioned by Parliament, for the whole United Kingdom. This was first commenced in Ireland in 1824, and extended to Scotland in 1838. These being completed, the final field survey for enlarged scales is now prosecuted vigorously through England and Wales.

It is not the purport of this paper to enter into any account of these results, but to relate some events concerning the origin of the survey, that are not generally known. These are not only of interest to scientific men but they furnish incidents of a popular character, that may command the attention of the general public. Most people who take cognizance of such apparently common-place records relating to land surveying, are apt to form opinions that these are circumscribed within technical bounds, only interesting to professional men. This may be the case where the area of survey is confined to a few acres, or even square miles; but when it embraces the boundaries of a kingdom, the phases of surveying are enlarged, altered, and expanded into the sphere of world-wide geodesical boundaries. Hence the project of a trigometrical survey of the United Kingdom, on that system of mensuration which includes the British Isles as a segment of the earth's circle, was grand in its scientific inception, and developed genius in executing the design with instruments of unparalleled accuracy. Like most great and beneficial projects for the advancement of civilisation, the Ordnance Survey, now so gigantic in its operations, rose from small beginnings: and these were, as it has often happened, of a military nature.

On the roll registering the names of the many talented officers who have conducted the field operations of the survey, that of Major-General Roy, R.E., stands first and highest—without disparagement to his successors—and he may be designated the "Father of the Ordnance Survey." Among the many excellent remarks contained in his papers published by the Royal Society in the *Philosophical Transactions*, the following on the general subject is appropriate:—"Accurate surveys of a country are universally admitted to be works of great public utility, as affording the surest foundation for almost every kind of internal improvement in time of peace, and the best means of forming judicious plans of defence against the invasions of an enemy in time of war; in which last circumstances their importance usually becomes the most apparent. Hence it happens, that if a country has not been actually surveyed, or is but little known, a state of warfare generally produces the first improvements in its geography: for in the various movements of armies in the field, especially if the theatre of war

be extensive, each individual officer has repeated opportunities of contributing, according to his situation, more or less towards its perfection. These observations being ultimately collected, a map is sent forth into the world, considerably improved indeed, but which, being still defective, points out the necessity of something more accurate being undertaken, when times and circumstances may favour the design."

In these remarks General Roy succinctly defines how the military element first suggested the design of a national survey previous to its scientific inauguration He informs us that the rise and progress of the rebellion which broke out in the Highlands of Scotland in 1745, and which was suppressed at the Battle of Culloden in the following year, convinced the Government of what infinite importance it would be to the State that a country so inaccessible by Nature should be thoroughly explored and laid open, by establishing military posts in its inmost recesses and carrying roads of communication to its remotest parts. With a view to the commencement of arrangements of this sort, a body of infantry was encamped at Fort Augustus in 1747, where Lieut.-General Watson was officially employed as Quarter-master, and Roy, at the time a Lieutenant, was his assistant. Watson first conceived the idea of projecting a Map of the Highlands, on the principles of trigonometry, and subsequently he obtained permission to execute it with the assistance of Roy. At the outset his observations were confined to these districts, but afterwards they extended to the Lowlands, and thus made the survey general in what related to the mainland of Scotland.

For eight years General Watson and Lieutenant Roy were engaged in this military survey, with a party of soldiers and camp equipage, which cost an extra sum to their pay annually while traversing the country; yet that was inadequate to the execution of so great a design in the best manner. Moreover the trigonometrical observations were carried on with instruments of the common, or even inferior, kind used at that period; hence an accurate map of Scotland could not be produced from manuscript drafts, so that it was never published. At the same time it perfectly answered the purpose for which it was intended, and was considered as a magnificent military sketch map. It would, however, have been completed, including the smaller Scottish Isles, and many of its imperfections no doubt remedied; but the breaking out of the Continental war in 1755 prevented both, by furnishing service of other kinds for those who had been employed in it.

When peace was restored in 1763 the Government took the matter into consideration for the first time, and they entertained favourably the project to make a general survey of the whole of Great Britain and the adjacent islands at the public cost. The map of Scotland was to have been made subservient, by extending the great triangles quite to the northern extremity of the island, and filling them in from the original manuscript draft. Thus that imperfect work would have been effectually completed, and the nation might have reaped the benefit of what had already been done at a very moderate extra expense. By this time General Watson had died, and now Lieut.-Colonel Roy, having been promoted, the direction of the survey was to be committed to his charge. His hopes of entering the field were delayed from year to year, although the times were pacific and favourable for carrying a work of so laudable a nature into execution. Nevertheless twelve years elapsed since the scheme had been first proposed without any advance in the field, when again war broke out with the American colonies in 1775, which checked the attempt of prosecuting this peaceful pursuit.

Notwithstanding these delays and checks to the prosecution of his favourite project, Colonel Roy manfully bore up against them, feeling satisfied that in time they would be carried out; but peace must be once more restored before any new effort could be made for the purpose. Meanwhile, in the ordinary course of his military duties, wherein the very best opportunities, as an officer of the Royal Engineers, offered of acquiring a thorough knowledge of the country, he did not fail to observe, in a general way, such situations as seemed to be best adapted for the measurement of base lines that would be necessary to form the nucleus of triangulation. While in London and the suburbs in 1783, he embraced the opportunity, for his own private amusement, to measure a base of 7,744·3 feet across the fields which then existed between Marylebone and St. Pancras. This he intended as the foundation for a series of triangles, carried on at the same time, to determine the relative situations of the most remarkable steeples and other edifices in and about the capital with regard to each other and the Royal Observatory at Greenwich. While thus engaged, peace had been concluded with America, and the hopes of the enthusiastic officer rose at the prospect of undertaking a national survey. In that he was not mistaken, and much sooner than he expected; but the successful influence came from an unexpected quarter, superseding the original military scheme by the powerful element of science.

Roy relates the circumstances which led to the practical inauguration of the Ordnance Survey as follows:—"In the beginning of October 1873, Comte d'Adhemar, the French Ambassador, transmitted to Mr. Fox, then one of his Majesty's (George III.) principal Secretaries of State, a memoir of M. Cassini de Thury, in which he sets forth the great advantage that would accrue to astronomy by carrying a series of triangles from the neighbourhood of London to Dover, there to be connected with those already executed in France; by which combined operations the relative situations of the two most famous observatories of Europe, Greenwich and Paris, would be more accurately ascertained than they are at present. This memoir the Secretary of State, by his Majesty's command, transmitted to Sir Joseph Banks, the very respected and worthy President of the Royal Society, who, about the middle of November, was pleased to communicate it to me, proposing at the same time that I should, on the part of the Society, charge myself with the execution of the operation. To this proposition I readily assented, on being soon afterwards assured, through the proper official channels, that my undertaking met with his Majesty's most gracious approbation." Not only did King George III., then a young man, approve of the project, and the appointment of Colonel Roy as superintendent of the survey, but he "supplied the funds that were judged necessary." On his part, Roy acknowledged that "what his Majesty has been pleased to give so liberally, it is

our duty to manage with proper and becoming frugality, consistent with the best possible execution of the business to be done, so as to make it redound to the credit of the nation in general, and of the Royal Society in particular."

From these facts extracted from the *Philosophical Transactions* of that venerable and liberal-handed Society, it will be seen that this semi-military trigonometrical department of the Government, is indebted to royal munificence and private aid for its practical development, after being shelved for more than a quarter of a century. Moreover, but for the timely astronomical proposition of the French *savants* —members of the Academy of Sciences—it is probable that our national survey would have been postponed indefinitely. Therefore, a measure of indebtedness is due to France, for raising up a friendly rivalry in the field of science on British ground, which has culminated in a trigonometrical survey of the United Kingdom, that has no parallel in the world for accuracy of detail and geodetic principles of design. When the executive Government of the day were impressed with the importance of the undertaking, they at once placed the embryo scheme under the Master-General and Board of Ordnance, with power to appoint engineer and artillery officers, with soldiers and artillery-men, to conduct the operations, and that is how it obtained the name it bears up to the present day.

Having secured the royal patronage and Government sanction to prosecute the survey, "being the first of the kind on any extensive scale ever undertaken in this country," Colonel Roy and Sir Joseph Banks, with other colleagues assembled in Council to consider the plan of the first operations and the instruments most suitable for microscopic mensuration and telescopic triangulation. As stated by Roy, the operation naturally enough subdivided itself into two parts. First, the choice of ground and measurement of a base line, with every possible care and attention, so as to form the foundation of future work. Secondly, the disposition of the triangles, where the base was to be connected with such parts of the English coast as are nearest to the coast of France, and the determination of their angles by means of the best instrument that could be obtained for the purpose. On inquiry of the Astronomer-Royal, Dr. Maskelyne, concerning the latter, their resources were miserably deficient, especially as compared with the French terrestrial instruments and apparatus. Not only had these to be constructed, but new designs invented. Fortunately, a scientific instrument maker named Ramsden, on being consulted, proved himself to be the man for the occasion, and, ultimately, through the liberality of the Royal Society, eclipsed the Parisian makers in design and manufacture.

Without delay the Council entered the field of action under the guidance of Roy, who conducted them on the 16th April, 1784, to Hounslow Heath—a locality at that period infested by highwaymen. This level ground had always appeared in his eyes to be one of the most eligible situations for a base, because of its vicinity to London and the Royal Observatory at Greenwich; also its great extent and the extraordinary levelness of its surface without any local obstructions to render the measurements difficult. At that time it was a wide bleak expanse, with only a few villages and farm houses dotting the plain, where now suburban towns flourish. The party began their observations at King's Arbour, at the north-west extremity of the heath; and having proceeded in a south-east direction by Hanworth farm, they finished at Hampton Poorhouse near the side of Bushey Park. It was then and there decided that the first base line should be measured between these two points.

At this period a tolerably fair map of Middlesex existed, but the meridians were calculated from London, where a private observatory stood at the corner of Argyll Street. With this map in hand, Colonel Roy estimated the distance of the mensuration ground to be upwards of 5 miles. During the inspection it was perceived that the first part of the operation, in order to facilitate the measurement, would be the clearing from furze bushes and ant-hills a narrow tract along the heath, as soon as the ground should be sufficiently dry to permit the base to be accurately traced out. "Chiefly with a view to the more effectual execution of the work, it was judged to be a right measure to obtain and employ soldiers, instead of country labourers, in tracing the base, clearing the ground, and assisting in the subsequent operations. For, at the same time that this was obviously the most frugal method, it was evident that soldiers would be more attentive to orders than country labourers, and by encamping on the spot would furnish the necessary sentinels, particularly during the night, for guarding such apparatus as it was foreseen must remain carefully untouched, in the frequent intervals of discontinuing and resuming the work. Accordingly a party of the 12th Regiment of Foot, consisting of a sergeant, corporal, and ten men, were ordered to march from Windsor to Hounslow Heath, where they encamped on the 26th of May, close by Hanworth Summer-house, to which spot the necessary tents, camp equipage, and entrenching tools had been previously sent."

Without delay the troops commenced clearing the ground, which was divided into three sections, averaging 8 feet in breadth. In directing the telescope for this purpose it was accidentally found that by leaving Hampton Poorhouse a little to the westward, or right, the line would coincide with the spire of Banstead Church. As there could not be a better situated or more conspicuous object than this, therefore, it formed the first or south-east section of the base. When this was cleared the second section began between the Summer-house and the great road leading from Staines to London. Here a pyramidal bell-tent was placed at the station, and camp-colours were then arranged from distance to distance, so as to be in a line with it and Banstead Church spire. In like manner the third section comprehended between the Staines Road and King's Arbour was traced out. This first tracing of the base was done by means of a common telescope, held in the hand only, that no time might be lost by employing the soldiers to smooth the track that was to be measured. Subsequently he traced out the line more accurately with a transit instrument, his own property, for which a portable stand had been for some time preparing. This candid admission of Roy that he commenced operations with inferior instruments of observation shows his zeal on the one hand, and on the other a

want of resources from which he might have been supplied, such as Greenwich Observatory. But it is evident that up to that period Government paid little or no attention to stores of this peaceful description beyond the astronomical requirements of that noble institution. In that respect it may be said that the inauguration of the Ordnance Survey began a new era in the design and manufacture of instruments and apparatus for accurate territorial mensuration. As already mentioned these were greatly facilitated by the skill of Mr. Ramsden, who had earned a reputation by inventing a sextant and an improved series of mathematical instruments. Accordingly, the Council of the Royal Society gave him orders to furnish a special apparatus for measuring the line on Hounslow Heath, with the greatest possible accuracy and at the cost of the Society.

During the preliminary work of tracing the line and clearing the ground more time had been expended than Colonel Roy had calculated upon, in consequence of the unusual rainfall of the season, which prolonged its progress to six weeks. Therefore it was not until the beginning of July that the actual operation commenced. These otherwise unimportant circumstances are mentioned in order to illustrate the difficulties that attended the bantling survey on its introduction to the world, and the care bestowed by its sponsors in watching over its birth.

SAMUEL MOSSMAN.

MARINE SURVEY OF INDIA, 1876-77.

IN March 1876, Captain A. D. Taylor, the Superintendent of Indian Marine Surveys, undertook a visit of inspection to Akyab, Bassein, Rangoon, Moulmein, Tavoy, Mergui, and Pakchan, on the coast of Burma, for the purpose of testing existing charts and correcting errors; and he extended his tour to Junkseylon (Salanga), on the Siamese coast. His conclusion was, that no large port so much required to be carefully surveyed as Amherst, the existing chart of which was found to be most incorrect and incomplete. Accordingly, Navigating-Lieutenant Jarrad, R.N., was despatched to execute a survey of Amherst in the 'Clyde,' during the season of 1876-77. The chart of Tavoy was also found to be dangerously erroneous, and Captain Taylor himself took observations which enabled him, with Mr. Carrington's assistance, to produce a more reliable chart of that place; and an excellent preliminary survey of Junkseylon was obtained from Captain A. de Richelieu, of the Siamese navy. In July 1876, Captain Taylor, accompanied by Navigating Sub-Lieutenant Petley, R.N., went on a visit of inspection to False Point Harbour, and on his return he furnished the Government with reports on the projected improvements.

In March 1877, Captain Taylor was deputed to visit the harbours of Carwar and Marmagao on the west coast of India, in the Government steamer 'May Frere,' to report upon their relative merits as anchorages during the S.W. monsoon. He came to the conclusion that Marmagao was superior as a natural harbour; and he and Mr. Carrington have since constructed a new chart of Goa and Marmagao. In April 1877, Captain Taylor started on a tour of inspection of all the ports between Calcutta and Bombay, with the object of testing the charts, and to gather information of general use for navigation. The details of this tour will appear in the report for 1877-78.

A survey of the Madras roadstead, commenced by Navigating-Lieutenant Jarrad, R.N., has been continued by Navigating-Lieutenants Hammond and Pascoe, who arrived there in February 1877, and extended the soundings for 3½ miles, both northward and southward of the screw-pile pier. Meanwhile, Lieutenant Jarrad proceeded to his work on the Burmese coast, accompanied by Lieutenant Coombs, R.N., who joined the 'Clyde' at Moulmein.

The 'Clyde' having been proved to be unsuitable as a surveying vessel, a new steamer has been ordered to be built at Bombay, and until it is ready, the surveying operations have had to be carried on by boat parties.

The Department publishes hydrographic notices, the annual return of wrecks and casualties in Indian waters, and the tabular statement respecting lighthouses and light-vessels. Mr. Carrington has also been indefatigable in the compiling and drawing branch, and the services of this very accomplished and able draughtsman have been invaluable. In addition to the finished drawings prepared for engraving and photo-zincography, several new charts have been compiled which were much wanted, and are eagerly sought for by masters of vessels.

The progress of the Marine Surveying operations, under Captain Taylor, has been most satisfactory, and a department producing really important work has thus been fully established.

SIR GEORGE BACK.

THERE has passed away from among us the last survivor but one* of those famous North Pole Captains who were contemporaries of Parry, Franklin, and the Rosses. George Back has gone in the fullness of his years, yet few men will be more missed than the kind and staunch old Admiral, none will be more deeply mourned.

George Back was born at Stockport in 1796. He entered the navy in 1808, on board the 'Arethusa,' and served in boat actions on the north coast of Spain. In one desperate affair, when 14 were killed out of a crew of 18, young Back was taken prisoner by the French, and detained at Verdun until 1814. He afterwards served in the 'Akbar' and 'Bulwark.' In 1818 he served as a mate, under Franklin, in the 'Trent' during the Spitzbergen voyage, concerning which he often told many interesting and amusing stories. He next joined Franklin's land expedition down the Coppermine river, and along the Arctic coast of America from 1819 to 1822, performing the duties of surveyor and draughtsman. The party was heard of at long and uncertain intervals until they returned to astonish their countrymen with the tale of their hardships, fortitude, and achievements. Sherard Osborn truly describes the story of Franklin's expedition as an Iliad in prose, full of pictures of rare devotion to the most ennobling of causes, the advancement

* Admiral Bird, the companion of Parry in his attempt to reach the Pole in 1827, the Captain of the 'Terror' in the Antarctic voyage, and of the 'Investigator' in the Arctic voyage of 1848-9 is still alive.

of human knowledge. Prominent among its episodes is Back's fearful winter journey to bring succour to his chief. In 1821 young Back attained the rank of Lieutenant, and served in the 'Superb' in the West Indies and at Lisbon from 1822 to 1824. In 1825 he joined Franklin's second land expedition, and made a survey of the Arctic shores of America as far as Return Reef. He became a Commander in 1827.

In 1833 George Back was in Italy when he heard rumours that apprehensions were entertained for the safety of Captain Ross, who had left England in 1829. He, with a true chivalrous spirit, hastened home to offer his services to the Government for the conduct of an expedition to search for the missing explorers. His offer was accepted, and on February 17th 1833 he left England, with five followers, for the Hudson Bay Company's Territory. In this journey, Back discovered and explored the great river which bears his name, down to its mouth. The sufferings endured during this famous voyage were appalling, and the obstacles which were overcome were sufficient to try the boldest spirit. The whole story is modestly but ably told by the commander in his work published in 1836, which is beautifully illustrated by his own drawings; for he was a most accomplished draughtsman.* For his great service in discovering and tracing the Back or Great Fish River for 500 miles to its mouth, he was made a captain in 1835 by an Order in Council. King William IV. said to him, "You and I, sir, are the only two captains by Order in Council in the navy."

In 1836 the Royal Geographical Society recommended that a voyage should be undertaken with the object of reaching Wager River or Repulse Bay, and thence exploring the coasts by travelling parties, as far as the mouth of the Back river on one side, and Hecla and Fury Strait on the other. The command of this expedition was given to Captain Back, in H.M.S. 'Terror.' His first lieutenant, William Smyth, had recently made an adventurous voyage down the Amazon, and was an exquisite draughtsman. Owen Stanley, Graham Gore, and Robert McClure, names afterwards well known to geographers, were among the officers. In July 1836 the 'Terror' crossed Davis Straits and entered Hudson's Bay. Captain Back attempted to follow the course of Parry in the 'Fury' and 'Hecla' up Frozen Strait, but was stopped by heavy floes off Cape Comfort. They wintered in the moving pack, and when the 'Terror' was at length extricated in the following summer, she was almost in a sinking state. "The whole voyage," says Sir John Barrow, "was of a nature so extraordinary and unparalleled in the history of voyages, ancient and modern, as not to be forgotten even by the readers of it, still less by the spectators." During this service Captain Back displayed all the qualities of a great commander, and to his constant good-humour and cheerfulness, firmness and presence of mind in moments of peril, and seamanlike skill were due the preservation of the crew, and of the good ship which was destined to see much more service. The narrative of this famous voyage, beautifully illustrated by Lieutenant Smyth, forms one of the classics of Arctic literature.* On his return from this disastrous voyage Captain Back received the honour of knighthood.

Sir George Back was awarded the Founder's Gold Medal of the Royal Geographical Society in 1836, in which year he also became a Fellow; and he served for many years as Vice-President and on the Council. He was also a Gold Medallist of the French Geographical Society, a Fellow of the Royal Society, and D.C.L. of Oxford. He was one of the earliest members of the Raleigh Club (the forerunner of the Geographical Society and Club), and was President of the Raleigh in 1844. He became a retired Rear-Admiral in 1857, Vice-Admiral in 1863, and Admiral on October 18th 1867.

Dnring the anxious period when the searches for the Franklin Expedition were organised, Sir George Back was an invaluable adviser, and an active member of the Admiralty Arctic Committee. He took an intense interest in the fate of his old friend and commander, Sir John Franklin, and after the sad story was revealed by the discovery of McClintock, and relics were brought home from King William's Land, Sir George Back, always treasured up with religious care a little book of devotions which he had himself given to Captain Graham Gore, one of his old Lieutenants in the 'Terror,' and which was found among the relics.

When Sherard Osborn undertook the labour of obtaining the renewal of Arctic exploration, he received the warmest encouragement and support from Sir George Back; who at once concurred in the objects to be sought for, and the route that should be taken. His great experience and sound judgment made it impossible that he should err on these points. He was President of an Arctic Committee appointed by the Council of the Geographical Society in 1872, and of a similar Committee in 1874. His authority was based on the experience of 57 years, during which time he was either foremost in the ranks of the explorers, or was aiding and encouraging younger generations by wise advice and cheering words. He visited the 'Alert' and 'Discovery' before they sailed, and took a deep interest in the expedition. Nothing is more inspiriting to young men than to receive real kindness from their seniors, and this Sir George Back gave in full measure to the young officers who sailed for the Arctic regions in 1875. For Captain Markham and Commander Beaumont, especially, he felt very warm personal friendship.

On the return of the Arctic Expedition its conduct was attacked in the press, and then it was that the grand old veteran came to the front for the last time. As Macaulay truly said, "A man whose work is approved by his own profession need not care for the ignorant criticisms of outsiders." The nonsense of the newspapers was answered by a most emphatic rejoinder. The old Arctic officers assembled at a dinner to show their appreciation for the glorious work of their successors. They came up on purpose from all parts of Great Britain and Ireland, all uniting to approve most cordially of the achievements of their young successors. There assembled

* *Narrative of the Arctic Land Expedition to the Mouth of the Great Fish River, and along the Shores of the Arctic Ocean.* By Captain Sir George Back, R.N., in 1833-35. (Maps and Plates, 8vo., 1836.)

* *Narrative of the Expedition in H.M.S. 'Terror,' undertaken with a view to geographical discovery on the Arctic Shores,* By Captain Back, R.N. (Maps and Plates, 8vo., 1838.)

on the 6th of December 1876 as many as twenty-eight old Arctic officers, and Sir George Back, the Father of Arctic discovery, was in the chair. He spoke of the difficulties of the work, of the valuable results, of the ability and gallantry of the young explorers, and when he concluded such rounds and rounds of British cheers were sent forth as left no doubt of the verdict of old Arctics.

This memorable occasion was the last on which Sir George Back appeared in public. His life was one of great usefulness, especially at Ramsgate. For many a year his friends will remember the bright pleasant dinners at Gloucester Place, and the capital stories of their kind, warm-hearted host. He had led a good life, and on Sunday the 23d of June 1877 this true-hearted and gallant sailor passed painlessly away at the great age of eighty-two.

Reviews.

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CAPTAIN MARKHAM'S GREAT FROZEN SEA.*

THE history of the Arctic Expedition of 1875-76 is recorded in the work of Sir George Nares with its exhaustive appendix by Captain Feilden, and in the Parliamentary Blue Books. It is a memorable and glorious tale of work well done, and of great difficulties overcome. But there was also needed a more popular account of the proceedings of the expedition, and this has been supplied by Captain Markham.

There are many precedents for the publication of a supplementary story of Arctic adventure by an individual officer, in addition to the official history of an expedition. Dr. Fisher wrote and gave to the world a briefer and more popular account of Parry's first voyage. Captain Lyon, whose talented pencil furnished the illustrations for Parry's second voyage, also published his own charming narrative. Sherard Osborn in his *Stray Leaves from an Arctic Journal*, gave us the most fascinating picture of life in the far North that has yet appeared; and Macdougall's *Voyage of H.M.S. 'Resolute'* is a valuable contribution to Arctic literature.

Captain Markham, following these excellent precedents, has given a popular and most entertaining as well as deeply interesting narrative of every-day life on board H.M.S. 'Alert,' and while away sledging, during a very eventful service. He brought several special qualifications to the work. As a young lieutenant in 1865 he was a volunteer for Arctic service, and he watched with eager interest the efforts of Admiral Sherard Osborn to secure a renewal of Polar research during the succeeding years. So thoroughly imbued was Albert Markham with the true old spirit of Arctic adventure, that he undertook a voyage in a whaler in 1873, and penetrated down Lancaster Sound and Barrow Strait into the Gulf of Boothia. His account of a *Whaling Cruise to Baffin's Bay*, for which Admiral Sherard Osborn wrote an Introduction, is exhaustive in itself, and is the only complete description of the work of a whaling voyage that has appeared since the days of Scoresby. Thus when Albert Markham was appointed commander of H.M.S. 'Alert,' ice navigation was no new experience to him. He had already acquired that love for the ice-floes and for the unequalled scenery of the far North which never leaves a true Arctic officer. His position as commanding officer in the 'Alert,' and the lead he took in the organisation and conduct of the sledging work, gave him further special qualifications for his task; while his *Cruise of the 'Rosario'* and his *Whaling Cruise* had proved his literary talent and skill as an author.

The Great Frozen Sea will be found to be a pleasantly-written narrative of a very important and memorable service, describing the events and the daily life as they presented themselves to an individual member of the expedition. It is, however, more than this. Captain Markham is the leader who has been nearer to the North Pole than any other man, alive or dead. He has won the blue ribbon of Arctic adventure, which had belonged of right to Sir Edward Parry during the previous forty-nine years. Captain Markham's work contains the record of that unequalled achievement. In one chapter he gives all the details of sledge travelling, the weights to be carried, the system of depôts, the scale of provisions, the clothing, the tents, the cooking apparatus, the construction of the sledge, and the programme of work. In another he describes the routine of sledging, the encamping, the tent life, the meals and cooking, the halts, and the work over the ice. Then follows the terrible story of the advance over the "Great Frozen Sea," which culminated in the attainment of the highest northern point ever reached by man, and concluded with a story of appalling sufferings most nobly and courageously born.

It is this history of the most memorable of all Arctic sledge journeys, written by its commander, which will give Captain Markham's work a permanent place in English literature; but the whole volume is entertaining and instructive, and does not contain a single dull page. *The Great Frozen Sea* takes rank with Sherard Osborn's *Stray Leaves* as a model of what an Arctic narrative should be; while the maps and illustrations give it a completeness which was lacking in Osborn's charming book. Captain Markham dedicates his work to the memory of Admiral Sherard Osborn, who was the moving spirit in securing the despatch of the Arctic Expedition, and whose bright example inspired to further efforts the gallant band which followed in his footsteps, and strove to emulate his deeds.

* *The Great Frozen Sea: A Personal Narrative of the Voyage of the 'Alert' during the Arctic Expedition of 1875-76.* By Captain A. H. Markham, R.N. (Daldy, Isbister & Co., 1878).

STANLEY'S DESCENT OF THE CONGO.

THE second volume of Mr. Stanley's work* contains his narratives of the navigation of Lake Tanganyika, of the march across Manyuema to Nyangwe, and of the descent of the Congo. On Tanganyika he was following in the footsteps of Cameron, but from Nyangwe his own great discoveries commenced.

On the 5th of November 1876, Stanley set out from Nyangwe with 154 followers—men, women, and

* *Through the Dark Continent.* By Henry M. Stanley. (Sampson Low, 1878.) Vol. II.

children, armed with rifles and muskets, but of these only forty were trustworthy fighting men, the rest being mere *pagazis*, or carriers. It was a great undertaking, one of the greatest in the annals of geographical discovery. The Congo had been a mystery for centuries. The vastness of its mouth and lower course proved that the mighty river drained an enormous unknown area, and the head waters discovered by the Portuguese and by Livingstone indicated to geographers the extent and direction of the great stream. But from Nyangwe to the falls discovered by Captain Tuckey, a distance of 900 miles, the course of the Congo was unknown. It was to solve this great problem by descending the river, that Stanley turned his back upon Nyangwe, and marching northwards on the left bank, plunged into a dense forest. On the 19th the party reached the banks of the Congo in 3° 35′ S. latitude, and 25° 49′ E. longitude, where it was 1200 yards in width. Here his boat, the 'Lady Alice,' was put together and launched on the river. The party then advanced in two divisions, one in the boat and the other following the bank, which alternated with forests and cultivation surrounding villages. Market places, at intervals of three or four miles, are central resorts of the people from either bank, and are considered as neutral ground. Many of them are wide grassy spaces under the shade of mighty spreading trees, with black forest in the background.

On the 22nd of December, Stanley parted with the Arab escort which had accompanied him thus far. The explorer, with his one English companion Francis Pocock, then proceeded on this perilous voyage down the river, with the exploring boat 'Lady Alice' and 22 canoes. The banks were now very populous, and the river 1800 yards wide.

On December 30th they came to the mouth of the great tributary flowing from the south-east called the Lowwa, a thousand yards in width, with an impenetrable forest fringing its banks. A mile lower down the Congo, in latitude 1° 28′ S., is two thousand yards in width. Down to this point there had been four great affluents, the Luama, Liva, Uvindi and Lowwa, in a course of 200 miles. The mouth of the Lowwa is 50 miles north of the north-end of Lake Tanganyika, and its sources are supposed to be near the south-west corner of the Albert Nyanza. Up to this point the tributaries from the east are unimportant.

Then came the series of cataracts which the discoverer has named the Stanley Falls. Here the Lumami affluent enters the Congo with a mouth 600 yards wide, in about 0° 32′ S. At the foot of the fifth cataract the river is 1630 feet above the sea, and still running N.N.E. Then it widens again to 2000 yards, and contracts again at a sixth cataract, which is nearly on the equator, and there is yet a seventh cataract. It occupied the explorers a period of twenty-two days of desperate labour to pass these falls by cutting roads through the forests, during which period they were beset and attacked by cannibal savages who had made the islands amid the cataracts their fastnesses. On the 28th of January 1877, they were again on the broad river, flowing between hilly banks to the west-north-west. The river gradually increased in breadth from 3000 to 4000 yards, with numerous forest-covered islands.

On February 1st they reached a great tributary called the Aruwimi, flowing from the north-east, the mouth of which is about 340 miles north of Nyangwe. This is the most important affluent of the Congo from the eastward country, and Mr. Stanley conjectures that it is the Wellé of Schweinfurth. Below the Aruwimi the great Congo becomes much wider, and is full of islands, densely covered with forest. The river reaches a north latitude of 1° 40′ N., and then bends to the southward. On February 18th they were on the equator again, the river continuing its course southwards, the volume becoming enormous. In S. latitude 3° 14′ 4″ is the mouth of the Quango, a powerful river issuing through a cleft in the tableland. Now the shores become lofty and picturesque, here bold and precipitous, there wooded from base to summit, and, flowing onwards, the river forms an extensive pool 2500 yards across, bordered by white cliffs, with a grassy tableland above. It received the name of "Stanley Pool," and extends over thirty square miles to the first cataract of the lower Congo falls, in 4° 3′ S.

Mr. Stanley gives a minute and graphic description of these lower falls, which were first made known to us through the labours of Captain Tuckey, who so nobly sacrificed his life in the cause of geography. The first cataract is a two hundred yards stretch of broken water, the next is half a mile of dangerous rapids, and the third is four miles in length, a confused mass of roaring waves and tempestuous surf. Then follow other dangerous rapids, over one of which a canoe, containing Stanley's favourite servant Kalulu, was hurled, every soul on board being seen no more; and shortly afterwards, on June 3rd, 1877, poor Frank Pocock, the last of the three English companions of Stanley, was drowned. On July 31st the explorers completed their great work by reaching the furthest point of Captain Tuckey, at the Yellala Falls of the Congo. Stanley then wisely struck overland for Embomma, the nearest European station on the lower Congo, abandoning the 'Lady Alice' to her fate. On the 9th of August, Stanley, with his wayworn party of 115 men, women, and children, reached Embomma, where they received a hearty welcome from the European merchants, and all their wants were attended to.

We must refer our readers to Mr. Stanley's own pages for the hair-breadth escapes, the fights with savages, the desperate struggles with natural difficulties of all kinds; as well as for descriptions of scenery, and for much interesting ethnological information. In this review it has only been possible to furnish a general account of the physical features of the newly-discovered course of the great river Congo.

TO THE ARCTIC REGIONS AND BACK IN SIX WEEKS. By *Capt. Alex. W. M. Clark Kennedy, F.R.G.S., F.L.S., F.Z.S., &c.* (Sampson Low, Marston, Searle, and Rivington; 1878).

AFTER reading the title of this book, we at least expected that the author would have carried us with him to the bleak shores of Novaya Zemlya or to Spitzbergen; but on opening the work we have found that it is merely an itinerary of a drive in a carriole from Christiania to Trondhjem, and from thence by coasting steamer to Tromsoe. "Across the Arctic Circle" would have been a more suitable title. To eke out a volume of over

400 pages describing a well-known route, yearly travelled by scores of our countrymen on their way to the more northern parts of Norway, in pursuit of sport or business, the author has drawn copiously on the guide-book, and quoted profusely from other writers on Scandinavia. To call a passage in a coasting steamer along the western shores of Norway, a journey to the Arctic Regions, is drawing somewhat largely on the good-nature and credulity of the public. With equal justice might a passenger through the Suez Canal entitle himself an African traveller.

Throughout the pages of this book Captain Clark Kennedy figures to even less advantage as a naturalist than as a geographer. He appears to be uncertain whether seals and *cetaceæ* are not the same order of animals, and has a lingering belief in the appearance of the Kraken, or sea-serpent, on the Norwegian coasts. Several of the illustrations originally appeared in a well-known and popular work, descriptive of real adventure in the Arctic regions, by one of our most distinguished Polar navigators; and they have no reference whatever to anything in the text of the present volume.

THE HIMALAYAN SYSTEM.

A REVIEW BY BARON F. v. RICHTHOFEN.

Translated from the "Verhandlungen der Gesellschaft für Erdkunde zu Berlin, Band v. No. 1 u. 2."

1. TRELAWNY SAUNDERS. *A Sketch of the Mountains and River Basins of India.* London, 1870.—I. *The Himalaya Mountains and Tibetan Plateau* (p. 4—7).
2. CLEMENTS R. MARKHAM. *Narratives of the Mission of George Bogle to Tibet and of the Journey of Thomas Manning to Lhasa.* London, 1876. Introduction.
3. CLEMENTS R. MARKHAM. *The Himalayan System.* (*Geographical Magazine*, May 1877, p. 113 *et seq.*)
4. TRELAWNY SAUNDERS. *The Himalayan System.* (*Geographical Magazine*, July 1877, p. 173 *et seq.*)
5. ROB. B. SHAW. *Water partings versus Ranges.* (*Geographical Magazine*, December 1877, p. 314 *et seq.*)

IN the history of orography three stages may be distinguished. As hydrography generally precedes topography, so water-partings come to be hypothetically regarded as mountain ranges; those between the principal rivers being considered as ranges of the first degree, and those between minor streams as ranges of lower degrees. By a knowledge of the elevations and depressions of a country, we arrive at the second stage, and find that the mountain ranges do not always coincide with the water-partings. Some of the ranges are found to be intersected by rivers, and the most general features of the structure become apparent. A third stage is reached when we have obtained from the geological composition not only a scientific knowledge of the main features of the formation, but also understand the laws of the arrangement of the secondary features. The transition from the first to the second stage can be seen most distinctly in those mountain systems which have only in our own time become known, as, for instance, in the case of the Tian-Shan and the Pamir mountains, where, in the unexplored districts, the water-parting system still regulates the drawing of our maps;* whilst, in all districts which have been surveyed more accurately, range after range appears distinctly, with frequent fluvial intersections. In the case of the Himalaya mountains their cartography preceded a correct conception of their main features. Captain Herbert, in the year 1818, investigated the orography of the Himalaya for the first time scientifically, took the water-parting between the Upper Indus, the Upper Sutlej, and the Yaruzangpo on the one hand, and the tributaries of the two former and the system of the Ganges on the other, as the principal range of the mountain system. But as he knew very well that the highest points were not on this line, but south of it, and between the rivers that follow a southerly direction, he took for granted that between the latter, spurs projected from the principal range, which were crowned with the highest points. Most of his successors took the same views, even such men as Dr. Thomson, Dr. Hooker, and Mr. Brian Hodgson. Ritter and Humboldt have not expressed any opinion about the great ranges of the inner system of the Himalaya. A. Cunningham had the merit of having prepared the way in his important work on "Ladak," by dividing the North-western Himalaya into a number of parallel ranges without regard to their interruption by rivers. The Pir Panjal quite coincides with the newer views. The works of Strachey (1854) made a further contribution to the scientific view of the north-west mountains; but it was Stoliczka who supplied the geological formation thoroughly for a small portion of the mountains.* These views, however, have advanced but a little way up to the present time, and even now in Germany it is often thought that the highest points of the Himalaya are situated on spurs of the principal range. Lately, it has been distinctly laid down, especially by Saunders (in his *Mountains and River Basins of India*, 1870),† and again by Markham (in the *Memoir on the Indian Surveys*, 1871, and in his *Bogle and Manning*, 1876) that three principal chains can be distinguished, two of which are placed by Saunders, and all three by Markham, in the system of the Himalaya. Both united into one range, the high series of points which are divided into a number of separate masses by deep valleys, which they called the Southern range, and distinguished from it the principal water-parting range as a range of minor orographic importance.‡ Markham called the Middle range Saunders's Northern range. Both agreed also in adopting a third range further north, drawing it, however, not according to the same principles as the first, but according to the water-parting principle. Markham attached it to the Himalaya, and called it Northern range; he divided it into two parts, of which the Western should form the water-parting between the Indus and the Basin of the Lob-nor, and the other between the Yaruzangpo and the table-land of High Tibet, which possesses no outflow. Saunders had previously defined the two ranges, calling the Western the Karakoram range, the Eastern the Gangri ("snow capped") range, and considered both as not belonging to the Himalaya.

These views were lately severely attacked in India. The character of a range is denied to the Southern range, on account of its frequent intersections; and a continuous function as a water-parting is put forward as the necessary mark of a mountain range. Both geographers have replied thereto, and acquired the merit of having triumphantly established the principle adopted long ago from a purely geographical point of view by geologists, but rarely admitted by geographers, *that mountain ranges are to be considered independently of interruptions and intersections by river valleys*, and that the latter are only to be regarded as solutions of continuity of a secondary importance. They have succeeded at the same time in bringing forward a concrete example of their principle in that most important case—the range of the high points of the Himalaya. The Middle range of Markham forms almost a continuous principal water-parting,

* See, however, an exception in the map of the Himalaya and Tibet, by Saunders, *Geog. Mag.* July 1877, in which the great ranges of the Himalayan System are connected with those of the Pamir. ED.

* In 1865 H. B. Medlicott contributed a Memoir and Geological Map of the sub-Himalaya between the Ganges and Ravi to the *Memoirs of the Geological Survey of India*, vol. 3. ED.

† And more especially in the article on the Himalayan System, with a map, in the *Geog. Mag.* July 1877. ED.

‡ It is rather of distinct than minor importance, because so far as it has been surveyed, there is no reason to suppose that its altitudes are inferior to those of the Southern range. As a water-parting it is of greater importance. ED.

only interrupted at a few points by rivers; and yet it is thought to be of less importance than his Southern as a mountainous range, although the latter is broken up into separate masses like a string of beads. A table appended to Saunders's paper gives 68 high points all distinctly located by the three co-ordinates of geographical latitude and longitude and height above the sea, attaining more than 20,000 feet, and 18 of them more than 25,000 feet. What Saunders proves by his striking logic, is pictorially shown by the plastic drawing which always gives such a special value to the maps of the distinguished Geographer of the India Office. It is to be expected that with reference to the Southern range, the range of the highest point of the Himalaya at present known, this view will, on the whole, be maintained, though with regard to some parts, the knowledge of the geological formation may produce changes.

It is only employing in another case the principles put forward by the geographers above mentioned, when Shaw differs from their views of the Karakoram range, and thereby from all previously-expressed opinions. The primitive conception of a water-parting system, supposed to surround the sources of the Shigar and the Shayok in a great circle, and also to embrace that high point of 28,278 feet known as K 2 (also erroneously named Dapsang), as well as the Karakoram pass, had hitherto regulated theories and cartography. And yet it is just here that the aspect of the river course shows with special distinctness the presence of some ranges parallel to the North-west Himalaya. Their existence is, moreover, made probable by the geological observations of Stoliczka and Bellew. Shaw, whose topographical descriptions show a rare talent for the conception of plastic proportion of the ground, was able to come to the same conclusion on the basis of this view. He compares the table-land in which Karakoram pass is situated, and which he surrounds by the Muztagh chain in the south-west and the Kuenlun chain in the north-east, to a terrace supported by two walls above it. "If one of these walls become damaged, so that the rain accumulating on the terrace escapes through crevices, we have no right to say that it is no longer a supporting wall, but is itself supported by the terrace, and surrounds the little streams that run through its crevices." But such is the case of the Karakoram pass, which is situated far behind the wall of the Muztagh, on a smooth table-land, and from which the springs of the Shayok gather, in order to escape through the crevice in the hard mountain-range. The case is similar, according to the descriptions of travellers, with the sources of other rivers of the Shayok basin. Thus the relief confirms the conclusions which we have drawn on a former occasion from the contributions of Stoliczka. A principal range, for which the name Muztagh range (instead of Dapsang range or Karakoram mountains) ought to be retained, must be introduced in consequence of its parallel course, with increasing certainty, as a member of the Himalayan system. South-west of it, towards the Indus, further subordinate, yet still important, parallel ranges seem to spring up; whilst in the north-east follows the Karakoram zone, marked by softer structure (belonging to the trias and coal formations), which, with its covering of atmospheric *débris*, gives it a smooth surface.*

The map appended to the article of Mr. Saunders contains, like his previous works, much interest. It would lead us too far to go into the controversy which it invites by its hypothesis as to the development of the mountains from Assam to Northern China. However, we are glad that the author, contrary to his former opinions, regards the Lan-tsang-kiang and Nu-kiang as no longer leading to the Brahmaputra, but as the upper courses of the Mekong and the Salwen.

* Mr. Shaw's views have been controverted in this Magazine for January last, and in the present number, by Mr. Saunders. ED.

THE COUNTY OF EDINBURGH OR MID-LOTHIAN: ITS GEOLOGY, AGRICULTURE, AND METEOROLOGY. with an Agricultural Map of the County; Statistics showing the Acreage and Annual Value of the Chief Landed Estates, &c. *G. Ralph Richardson, F.R.S.E.* (Edinburgh 1878.)

THE illustration of agricultural statistics by means of maps and diagrams is a branch of cartography which is still in its infancy, but which will no doubt be elaborated hereafter, so as to become a very important aid to the study of economic science. In 1874 M. Achille Delesse published an agricultural map of France, in the *Bulletin* of the Geographical Society of Paris for July, intended specially to show the different soils. Mr. Richardson has constructed a map of the county of Edinburgh on the principle of the "Carte Agricole de la France" of M. Delesse, but instead of showing the soils, he has conveyed to the eye, by means of colours on the map, the various agricultural rentals of the county. A second map of the various soils, classified according to their mineralogical and chemical constituents, would complete the work of illustration; and the two maps would show a close connection with each other, and form admirable guides to the study of the agricultural statistics of the region. Mr. Richardson, in the present publication, has made a very useful commencement of a most important work, which, we trust, may be followed up by other labourers in the same field.

Such a system for the cartographic illustration of agricultural statistics would be invaluable in India where the machinery actually exists for preparing the materials, and where all that is needed is due encouragement and support, a guiding head, and above all continuity in the effort to secure one aim and object. But this last is wanting.

Geological Maps of New South Wales.

THE Government of New South Wales have published excellent geological maps of the districts of Hartley, Bowenfells, Wallerwang, and Rydall, which illustrate the extent and thickness of the mineral deposits in one of the most promising mining districts of Australia. The maps are carefully coloured and well executed, on a scale of 2 inches to a mile. These districts were geologically surveyed in 1875 by Mr. C. S. Wilkinson, the Government Geologist, who discovered and reported upon several seams of coal and iron ores. The maps are further illustrated by a vertical section.

THE March *Bolletino* of the Italian Geographical Society contains letters from Dr. Matteucci and Signor Romolo Gessi, dated Khartum 11th and 21st January respectively. The former anticipates a war between Abyssinia and Shoa and predicts the discomfiture of King Menelik, as his enemies are armed with Remington rifles. Kabariga, King of Unyoro, is reported as desirous of entering into a treaty with the Khedive through Colonel Gordon, a fact of some importance to travellers to Uganda, who will have to pass through the first-named country, formerly so full of obstructions.

The travellers were then on the point of starting and expected to meet some of the Antinori expedition at Kaffa (whither they purposed journeying by way of Sennar, Fazoglu or Fazukl, and Fadasi) about March.

In the same number we find a letter from Signor D'Albertis, announcing his arrival at Thursday Island in Torris Straits on the 4th January, after eight months' cruise up the Fly River in New Guinea, and promising further details at an early date.

Log Book.

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Professor Nordenskiold's Arctic Expedition.—Signor Bove writes under date 5th May from Carlskrona regarding Professor Nordenskiold's Arctic Expedition. He observes that he erred in describing the 'Lena' as of about 500 tons capacity, inasmuch as she is only 100 tons. The vessel is being actively prepared for her voyage, and the scene on board is at present a very busy one. The total complement of people on board is thirty, all told; the commander (Palander) having had a difficult job in the matter of selection, owing to the number of volunteers. The doctor's name is E. Almquist, and he enjoys a great reputation in Sweden for chirurgical and scientific acquirements. Every officer and every scientific officer will have a separate cabin to himself, an arrangement which has given great satisfaction. A Russian officer has been deputed to accompany the expedition, and Professor Nordenskiold writes to the effect that he has engaged an excellent hunter. Signor Bove says that arrangements have been altered as regards the method of exploration, and two extra sledges (in addition to two already supplied) have been put on board with the view of relying more on this means of locomotion.

Search for Franklin Relics.—In the article on "Eskimo reports respecting Sir John Franklin's Expedition," published in our April number, (p. 84), we announced that Messrs. Morrison & Brown, of New York, contemplated despatching Mr. Barry to the Arctic Regions in search for relics of Sir John Franklin. With this object in view, Mr. Barry left New York in the 'Eothen,' for Hudson's Bay, on the 19th of June last.

The Elburz Range.—In the proceedings of the Berlin Society we find an interesting review by Baron Von Richthofen of a lengthy paper by Dr. Emil Tietze on the structure of the Elburz range in Persia. He observes that hitherto the Elburz range has been a puzzle, and the notion that it formed part of the Persian system of ranges running north-west and south-east, and that its curvatures round the southern end of the Caspian resulted from, or were connected with, the formation of that depression, had not found universal acceptance. This theory has, however, been confirmed by Dr. Tietze's researches. He describes the range as the portion of the northern face of the Iranian plateau between the defiles of the Sefidrud and the Charsan pass in the west and the Bujnurd or Kuchan district in the east. Its length is between 400 and 450 miles, and its breadth about 70 miles; there are passes 7000 feet in height, peaks and ridges between 9000 and 14,000 feet, and Demavend attains a height of about 20,000 feet. The range consists of a series of chains more or less parallel to one another, which lose all importance as main water-partings or culminating ridges, but which are connected by saddles or cross ranges, which form the partings of minor individual streams. As in the Tian Shan and south-eastern China, so in the Elburz, the line of drainage runs, as a rule, between the parallel chains, but occasionally the stream deviates to the right or left, and cuts right through the range to pursue its course in a new valley.

The Elburz range consists of nearly every deposit between the azoic and tertiary strata. An axis of old crystalline rock is, however, wanting. In the western half the chains, as well as the strata and the main axis of the range run between N.W.—S.E., and W.N.W.—E.S.E. In the eastern half, the strata still follows this direction; while the main crest bends first from west to east and then from S.W. to N.E. The direction (?) of the strata denotes a condition of things existing ages previous to the convulsion of nature, which led to the deviation of the main axis of the range.

Mr. Baber in Western China.—Mr. Baber's report on the route followed by Mr. Grosvenor's mission between Tali-fu and Momien (between March 26th and May 3rd 1876), has at last been published. It is illustrated by a route map of the road between Yunnan-fu and Momien, in 4 sheets, on the scale of three miles to the inch, the route being laid down by dead reckoning and checked, though not corrected by latitude observations taken with an eight-inch sextant. Altitudes were taken with an aneroid. The report is written in a bright, jocular and thoroughly "non-official" style which makes it most pleasant reading. The tendency of the report will be to damp the hopes of any large trade springing up between Yunnan and British Burma. In Tali, at present, the goods and traders for the most part come from Canton, and Mr. Baber remarks that, loth as Englishmen are to admit it, the simple and evident approach to Eastern Yunnan is from the gulf of Tonquin (as Baron von Richthofen has long contended). But he thinks Shun-ning or some such town in the west of Yunnan may be approached by ascending the valleys instead of crossing all the mountain ranges as must be done if the Momien route be selected. Whether much trade is to be expected appears problematical. Regarding the poppy cultivation, Mr. Baber acknowledges himself to have been astounded at its extent in Yunnan; he estimates that the poppy fields constitute a third of the whole cultivation of that province. He further makes a remark which Mr. Justice Fry, and the Society for the Abolition of the Opium traffic will do well to note, *i. e.* if they desire to give the strongest possible impetus to its growth in Yunnan, let them by all means discourage its production in India. Some of Mr. Baber's identifications of places mentioned by Marco Polo are very interesting.

It may not be out of place to mention here that a descriptive itinerary of a route between Chun-king (on the Yangtse) and Yunnan-fu will be found in the *Bulletins* of the French Geographical Society for December and March last. The journey was made in December 1870 and January 1871, by M. Rocher, but we are not favoured with any explanation of the circumstances under which it was made.

Colonel Prejevalsky.—The Russian journals announce the arrival of Colonel Prejevalsky and his travelling companion, M. Ecklon, at St. Petersburg. The colonel proposes to continue his explorations next year.

The Inter-Oceanic Canal across the Isthmus of Darien—Signature of the Concession.—On the 23rd of March last a concession was signed at Bogota, the capital of the United States of Colombia, by M. E. Salgar, Minister of the

Interior, and M. Lucien N. B. Wyse, granting to the latter, on behalf of the Inter-Oceanic Canal Company, the exclusive right of constructing a maritime canal between the Atlantic and Pacific Oceans. The concession is for ninety-nine years, and includes the right, if the company wish it, of constructing a railroad parallel with the canal. The actual line of the canal is to be determined by an international commission of engineers, two of which are to be Colombians. The plan is to be submitted to the Government in 1881, and the work completed in twelve years; but six years extra will be granted, if necessary. The canal is to be large enough to afford passage for vessels 475 feet long, 52 feet wide, and 26 feet draught. The Company are to deposit 30,000*l.* as guarantee, in return for which they are granted a large tract of land. There are minor conditions relating to the details of the agreement.

The ports at the two ends of the canal are to be declared neutral for ever, as well as the waters of the canal, which are to be open to merchant vessels of the whole world. As regards ships of war reservations are made. Everything passing through the canal and deposited in the warehouses, as long as it is not for the use of the country, will be exempt from all imperial or municipal taxes. All canal dues will accrue to the Company for the period of the concession (ninety-nine years), and after that time the entire property, works, and plant will pass over to Government.

These are the principal terms of the convention, which will be vigorously pushed on when ratified by Congress.

The new Volcano in Patagonia.—The Patagonian volcano, referred to in our last number as having been discovered by the United States' ship of war 'Omaha,' had already been reported by Señor Moreno, of Buenos Ayres, nine months previously. It is the volcano of Chalten, a magnificent peak rising above this part of the Andes, and Señor Moreno placed it in 49° 8′ S. latitude, and 73° 10′ W. longitude. The Tehuelches of this part of Patagonia report that the Chalten volcano is almost always sending forth smoke and cinders.

Correspondence.

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THE KARAKORAM MOUNTAINS.

To the Editor of the "GEOGRAPHICAL MAGAZINE."

SIR,—As Mr. Shaw is so good as to admit that my previous letters have put the question between us in a nutshell, perhaps I may succeed in making the kernel acceptable to him on this occasion. He allows that if the facts were as I conceive them to be, that my nomenclature would be correct. His objections are (1), that the culminating summits are not coincident with the water-parting; and (2), that the Karakoram pass is restricted to the water-parting and does not cross the summits. These objections are easily answered, as it is not necessary for my purpose that there should be the coincidence mentioned; and the name of the pass, if otherwise applicable to the entire mountain mass, cannot be refused to the whole of the road or route through it within the limits of the mass. Indeed, my orographic nomenclature relates not merely to the water-parting or other summits, but to the whole mass, within the limits of its terminal extremities and bases, as distinctly defined by hydrographic conditions.

Thus I define the Karakoram mountains to be the mass that forms the water-parting between the basins of Lake Lob and the Indus. Its extremities are found where the water-parting of the Indus ceases to be conterminous with that of Lake Lob; and they coincide with the extremity of the Gangri mountains on the east and with that of the Hindu Kush on the west, those mountains serving to separate the Indus basin from the basins of the Oxus and the Tibetan Lakes respectively. The bases of the Karakoram mountains are the streams of the Upper Yarkand and Karakash rivers on the north, and a part of the Upper Indus on the south. Some may prefer to regard the range between the lower Shyok and the Indus as a separate system; but the same argument would divide the Sewaliks from the Himalaya, although it is generally convenient to connect them. Mr. Shaw desires me to substitute three names at least for the mass which I call the Karakoram mountains; but he has probably overlooked the advantage of indicating the relations between the orographic and hydrographic features of a mountain system, which is secured by my nomenclature. I am in hopes that Mr. Shaw will be persuaded by this mode of stating the case; and forgive me if I have been pertinacious in maintaining the integrity of a system which aims at facilitating the study of the mountains of India.

In conclusion I will endeavour to explain further my objections to the description of Zanskar as a part of Tibet, and reply to the arguments by which Mr. Shaw supports his view.

Correct territorial names in civilised states are those imposed or adopted by the supreme rulers of the territory for the time being. The substitution of unauthorised names often occurs in literature erroneously. It is also an error in political geography to use a name which belongs properly to history and historical geography for the name used in actual administration, and it is equally erroneous to ignore the changes which occur from time to time in the limits to which a name is applicable.

When usage sanctions a departure by foreigners from the authorised local name, the foreign name becomes subject to the same rules as the native name. Thus Tibet, being the name by which the great Chinese dependency on the north of India is known to the English, when the Chinese lost that part of it, including Zanskar and Ladak, became contracted within the limits retained by the Chinese, as France has become contracted since the last war.

Mr. Shaw refers to Western Turkistan. Turkistan is merely a literary expression, the limits of which are only subject to the exact definition belonging to a political division in the case of Russian Turkistan, which is a government with a name and limits defined by Russian law. Beyond those limits Turkistan may be said to include certain Khanates and extensive pastoral regions occupied by independent nomads, besides considerable tracts and cities in the Chinese Empire with Turkish populations.

It is thus shown that Turkistan is not a name of the same class as Tibet, and thus this comparison is not one of "like things with like."

Mr. Shaw is even more unfortunate with reference to Bengal, the Punjab, and Hindustan. What does he consider to be the limits of Bengal? They are certainly not the same now as they were under the Mogul Subah of that name. The Punjab is not the same now as it was before the mutiny. Hindustan is a name of the same loose class as Turkistan, and of similar variable application. But Mr. Shaw's argument requires that the territories that once came under one or the other of these denominations, should always continue so.

If the political illustrations fail, Mr. Shaw expects to rely with certainty on the physical aspects of the case, but I am unable to follow him. When we use

exact political terms to designate physical features, it is at least well to bear in mind the political use of the term. Taken in its widest sense the Tibetan plateau extends in latitude from the summits of the Southern Himalaya to the summits of the Kuenlun, and in longitude from the summits of the Yunling mountains to those of Hindu Kush. But bearing in mind the political limitation of Tibet, I am the more ready to observe the physical distinctions between the Chinese or Tibetan portion of the plateau and the portion which belongs chiefly to the Rajah of Kashmir, and which is commonly recognized as the Western Himalaya. Between the plateau of the Western Himalaya and that of Tibet, there are remarkable differences. In the first the total breadth is much contracted; the broad lacustrine basins and plains are wanting; mountains and valleys are more sharply moulded. When a traveller visits Zanskar or Ladak, it would be confusing to let it be supposed that he had seen Tibet, or the plateau of Tibet; while the scene of his exploits would be described accurately and without liability to misconception by the name of the Western Himalaya.

TRELAWNY SAUNDERS.

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THE SEA LEVEL.—No. II.

SIR,—In addition to the causes assigned for the lowering of the sea level in the paper you did me the honour to publish in the *Geographical Magazine* for February 1877, other causes for that phenomenon are brought to light by recent discoveries.

In the year 1873, Mr. Crookes recorded some experiments on the action of heat and light on gravitating masses. These experiments culminated in the invention of the radiometer. This instrument has been shown in lectures, and shop windows, by a metallic cross, with two or four arms, balanced on a pivot in a glass globe, from which the air is exhausted. When a ray of light impinges on the discs, the cross revolves. When the ray of light is taken away the revolution gradually ceases.

A law of force in light is thus established. At the end of last year, and in the beginning of this, M. Cailletet, at Paris, and M. Raoul Pictet, of Geneva, "*presque au même moment*" (*Pictet*), succeeded in liquefying and solidifying the permanent gases, under conditions of cold and pressure.

These discoveries all harmonise with natural laws, revealing to us the cause of rotation, revolution, and the separation of the elements.

Going back to the time before creation, we accept a nebulous mass, containing in it the bases of our air, water, and elemental matter—gravitating in a cold chaotic condition in or through impalapble matter.

When the first light impinged on this mass of heterogeneous but sensible matter, it acted as light acts on the radiometer. The gravitating motion was converted into rotation on its axis, and revolution round its centre of attraction. Under these motions the mass assumed the spherical shape, and must have been sensible in all its surface area to the influence of light. As the aerial and aqueous gases are drawn from the body of the earth now by the attraction of light and heat, so it must have happened with the elemental bases of the nebulous mass; the aerial gases were converted into atmosphere, the aqueous gasses into water.

Air and water are then fairly accounted for.

Under this system of drawing out the gases, it followed that molecules of matter became unsupported, and naturally gravitated to their own centre.

We have then a condition in the revolving and rotating mass, similar to the conditions at Geneva and Paris. The nebula was cold; the new-made air and water pressed upon its surface, the consolidating molecules pressed upon themselves, more gases were forced out, more air and more water were made, and with the increase of these elements more molecules of matter were consolidating. The same actions are going on now, under the laws of evaporation, condensation, and gravitation.

The nebular condition is adopted, not because anything positive is known of it, but because it has been adopted for the Beginning before, because we know of no other condition of primary chaotic matter, and because recent science has pointed out that a primary nebulous condition is almost a demonstrated fact. There can be no doubt that if the primary conditions were so, and if the laws of nature never have been broken, the actions that are now going on in our elements, under the influence of sun light, must have gone on in the Beginning under the same influence. The gases are evaporated from the whole body, the aerial gases become atmosphere, the aqueous gases become condensed, and gravitate as dew, rain, hail, snow, sometimes as inorganic or organic matter and the denser molecules consolidate.

Under no circumstances could these actions be rapid; but, having once began, they could not cease while the elements and the light continued. The consolidating surface may soon have offered an unequal undulating surface for the increasing waters to rest upon. This bed was continually subsiding by its own natural gravitation. Under this action the gases were continually pressed outward in a cold condition, till the subsidence or consolidation being nearly completed, the surface earth found its present condition. We see, feel, and know that this condition is due to natural laws; we do not know that these laws have ever been broken; we do not know if the consolidation is yet complete. Earthquakes, subsidencies, and ocean waves occur. The source of these phenomena must be in the deposits or in the continued consolidating molecules of the interior earth.

My former paper showed that the sea level had sunk some 6 or 5 miles, in consequence of the gradual wearing away of its own bed by its own forces. I now propose to assign two causes for the lowering of the sea level. 1st. The general and irregular subsidence of the interior. 2nd. The denudation of the water bed.

Yours, &c.,

H. P. MALET.

Proceedings of Geographical Societies.

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THE ROYAL GEOGRAPHICAL SOCIETY.

Anniversary Meeting 27th May, 1878.

THE Anniversary Meeting was held in the hall of the University of London, under the presidency of Sir RUTHERFORD ALCOCK, K.C.B.

The Report of the Council, which was read by Mr. CLEMENTS MARKHAM, stated that during the past year 187 Fellows had been elected, and that the finances were in a most satisfactory state, the total net income for the year being 7950*l*. Arrangements had again been made for the delivery of three lectures during the next session, respectively, by Prof. P. M. Duncan, Capt. F. J. Evans, and Mr. W. S. Thisleton Dyer.

The PRESIDENT then proceeded with the presentation of the awards, the Royal (Founder's) Medal to Baron F. VON. RICHTHOFEN, and the Victoria (Patron's) Medal to Capt. H. TROTTER, R.E., (see our May number, p. 125).

In the absence of Baron Richthofen, the Founder's Medal was delivered to Count MUNSTER, who said that it was the second time that he had had the honour to receive this great distinction for one of his countrymen.

Baron von Richthofen, who deeply regretted that he could not himself receive this Medal, wished to thank the Society sincerely for this token of sympathy and approbation, and declared in his letter that it would give him renewed courage and will to promote geographical research. These tokens of acknowledgment given to men of other nations were certainly, Count Münster added, the best means to encourage scientific inquiry and travel, and he would now only express the hope that England and Germany might always try to be foremost to promote civilisation and geographical knowledge.

The Patron's Medal was next presented to Captain TROTTER, who, in acknowledging the honour, said that some of the pleasantest moments of the traveller in distant lands were spent in thoughts of home and of the welcome he might expect if he had the good fortune to return. It was not, however, given to all to realize that welcome, and his comrade, the late Dr. Stoliczka, who was his constant companion in all his wanderings in Central Asia, died a martyr to duty when within a few days of the end of their journey. It was a source of gratification to him, he went on to say, to find himself supported on this occasion by Sir Douglas Forsyth, who had so ably conducted the embassy to Kashgar, and to whose zeal in the cause of geography he was indebted for the opportunities which had led to the discoveries alluded to by the President.

The Medals awarded to the successful competitors from public schools were next presented. In announcing their names (see our May number, p. 125), Mr. FRANCIS GALTON said that this being the tenth year of the examinations, he was glad to state that the work of the pupils examined showed that there had been a great improvement in the teaching in some of the public schools. Liverpool still kept its high place, and had now taken twelve of the Society's Medals. It was also announced that the subject for the next (1879) examination, both in physical and political geography, would be "The Barbary States and the Sahara."

Sir RUTHERFORD next proceeded to deliver his Annual Address. He congratulated the Society on the steady progress made in the past year, and for the valuable and permanent records of geographical progress and research contained in the *Proceedings* and the *Journal*, under the able editorship of Mr. Bates. Another subject of congratulation, also, was the marked and rapid increase in the number of Geographical Societies, both in Europe and America, there now being thirty-eight, some of them numbering their members by thousands, thus showing the popularity of the subject, and the general sense entertained among civilised nations of its utility, and the importance of a systematic prosecution of geographical research in regions still imperfectly known. Nor was this interest limited to individuals and Geographical Societies, for many governments within the last year had granted considerable sums in aid of exploration. After referring to the losses sustained by the Society in the death of numerous members during the year, the President reviewed the progress made in geographical research. He next invited attention to the nomination of an African Exploration Fund Committee, for the purpose of promoting the efforts to open up the interior of Africa to civilisation and commerce. The Report of the Committee was now ready, and he was glad to announce, in anticipation of further details, that the Committee recommended the despatch of a carefully-organized expedition to explore the country lying between the caravan road now in course of construction from Dar-es-Salaam (a few miles south of Zanzibar) and the northern end of Lake Nyassa, and should the expedition reach that goal, and adequate funds be available, it was contemplated to push on exploration to the southern end of Lake Tanganyika, a further distance of 190 miles. In conclusion, it only remained for him, on his retirement from the office of President, to congratulate the Society on the choice which had fallen upon the Earl of Dufferin, as his successor—one equally distinguished as a statesman and a scholar, and no less generally known as an accomplished man of the world, in whose keeping he felt assured the character and usefulness of the Society would not only be safe but receive fresh lustre.

Meeting of 3rd June, 1878.

A meeting was held on the above date, in the Theatre of the University of London, Sir RUTHERFORD ALCOCK, Vice-president, in the chair, when Mr. STANLEY read a paper entitled

A GEOGRAPHICAL SKETCH OF THE NILE AND LIVINGSTONE (CONGO) BASINS.

After a few introductory remarks by the CHAIRMAN, Mr. STANLEY proceeded to say that as Central Africa rose exhumed from its oblivion of 6000 years, they found to their wonder and delight that it possessed stupendous mountains, grand rivers, and lakes of great extent; that it was as prolific, rich in valuable vegetation and metals, as other continents. He intended to bring into prominence the three great results of his journey across the Dark Continent. The first of these was the circumnavigation of the Victoria Nyanza, resulting in the determination of its altitudes and the delineation of its coast line; the discovery of its great effluent, the Kagera, "the mother of the river," and its great affluent, the Shimeeyu. The next was the discovery of the Muta Nzigé, "the Lake of the Dead Locusts," one great indentation of which the explorer has now named "Beatrice Gulf." When starting for this splendid body of water Mr. Stanley presumed that he was *en route* for the Albert Nyanza, and it was not until he had compared his altitudes with those of Colonel Mason Bey and Sir Samuel Baker, that he discovered that Beatrice Gulf was an arm of some great inland sea as yet unknown on maps of Africa. From these and a single glance at the map it was evident that the great lake, with a boundless horizon to the south, which Sir S. Baker saw, terminated some half a dozen miles south of the spot from which that traveller took his observation. The third great point of the lecture was Mr. Stanley's announcement of the absence of all outlet to the Tanganyika. In illustration of these various points he produced a number of facts. On Oct. 20 1875 he boiled three thermometers, and ascertained Ripon Falls to be 3369, but when these thermometers were tested and verified at Kew, the verifications increased the altitude of Ripon Falls to 4093, making a difference of 624 feet. Captain George, from Mr. Stanley's data, furnished to the *Daily Telegraph* from Africa, calculated the height of Victoria Nyanza to be 3800 feet, but he had not then received the Kew corrections. Sir Samuel Baker gives the height of the Victoria Nile, below Ripon Falls, at Karuma, as 3766 feet, according to Dunkin 3794 feet, with Kew corrections 4054, which allowed only 39 feet for the Ripon Falls, and many miles of rapids. The altitudes of all would read thus: Speke, 1858, 3740; Speke, 1862, 3308; Stanley, according to Captain George, (thermometer not yet verified), 3800; Stanley, according to his own calculations, 3369, result after Kew corrections, 4093; Baker, on the Victoria Nile below Ripon Falls, thermometer unverified, 3766 and 3794; result with Kew corrections, 4054. The thermometric readings agree tolerably well. Baker's, below Ripon Falls, is 205° 4'; Stanley's, above Ripon Falls, at lake level, is 205.9. He boiled the thermometer on Lake Victoria 27 times. The mean of nine careful calculations, with Kew corrections, gave Lake Victoria an altitude of 4168 feet above the sea. Alluding to the Victoria Nile, he said that, given a breadth of 400 yards, a depth of 10 feet, and a current of three knots, they had 60,000 cubic feet of water falling out of the lake every second, which in 24 hours would be 20,908,800 tons, and in a year of 365

days, over 7631 millions of tons, or about 5 tons of the sweetest drinking water per annum for every inhabitant of this globe He recorded his admiration of Captain Speke, his predecessor in the region of Lake Victoria. Whether it is the enormous grey Nyanza, to which he attached the name of her Majesty the Queen, or that other, distinguished by the name of Albert, there was but little left for the actual circumnavigators to change. In latitude 0° 5′ 0″ N. he obtained a glimpse of an immense mass rising in the country of Gambaragara which he had called Mount Gordon Bennett, the height of which he estimates at 15,000 feet. It was only a day or two previous that he had obtained a view from a height of 6000 feet of a similar formation to the south, though not so elevated—which he had named Mount Lawson, in the district of Kibanga, in Ankori. Colonel Mason declared that the south-east angle of Lake Albert was 1° 11′ 03″ N.; but this position was only four miles south of Vacovia, above which, at an altitude of 1400 feet, Sir Samuel Baker gave, in very precise terms, a different version altogether. It was a hopeless task to attempt to reconcile two statements so diametrically opposed to each other. While the grey Nyanza expanded with equal breadth and length, the Tanganyika was like a deep crevasse, with a length of 329 miles and only a breadth of 28, deep sunk in the bosom of mountains, varying from 1000 to 3000 feet above its dark blue waves. The water area of the Livingstone (Congo) was larger than any other river in the world, unless they included the St. Lawrence. It covered 35,000 square miles. The great basin which lay between the western maritime region and the Central Lake region, and through which the Livingstone had channelled a broad channel of from one to eight miles in width, appeared to him to have formed the bed of a vast lake, extending from the Livingstone and Zambesi watershed south to the Nile-Shari, and Benué and Livingstone watershed north, with a breadth of 700 geographical miles, forming a vast inland sea of 630,000 square miles, nearly four times larger than the present area covered by the Caspian. Mr. Stanley concluded by thanking the President and Council of the Royal Geographical Society for the very high and signal honours they had bestowed on him for the few years he had sacrificed towards the solution of some of the secrets of African geography. Words of gratitude were soon uttered, but the feelings which prompted them in him would endure while he lived.

Meeting of June 14th, 1878.

AFRICAN EXPLORATION FUND.

A Meeting of the Subscribers to this Fund was called to Consider the Report of the Committee; Sir RUTHERFORD ALCOCK, President of the Committee, presiding.

The Committee in their report first gave a brief history of this movement, and next considered the position which the Royal Geographical Society ought to occupy with regard to the whole subject of African exploration and its future direction. The report points out that the Society cannot compete with Governments and with missionary societies in the scale of its explorations, having neither the powers of the first nor the pecuniary resources of the second, while by its constitution it is restricted in its objects to scientific and geographical research. The German Society, on the other hand, can take commerce within its range, and obtain a Government grant in aid, and the Belgian Society undertakes also philanthropic work. These objects, appealing to stronger feelings and more universally recognised interests than those of pure science or geography, receive greater support. Thus in Portugal a grant of 20,000*l.*, for explorations in Western Africa beyond the confines of the Portugese possessions, has been made by the Cortes. In France 100,000f. has recently been voted for a Central African Expedition; and in Belgium an income of nearly equal amount has been contributed by subscribers to the international scheme for the exploration of Africa (towards which the Committee have given 250*l.* from their fund; while the sum received for the African Exploration Fund, including 1,000*l.* granted by the Council of the Royal Geographical Society, amounts to only a little over 2,000*l.* Passing to the question of the sacrifices to be made by those who undertake this perilous work of discovery, the report points out that were all the inhabitants of Africa equally hostile and intractable it might well be doubted whether any more lives should be imperilled in efforts for the redemption of the country and of the whole race from barbarism and slavery. But there is abundant evidence that only certain tribes and regions are dangerous to approach; while vast tracts, capable of supporting an agricultural and industrious population, if cultivated, are only waiting the hand of civilised man and a Christian spirit to establish, with willing aid from native tribes, peaceable communities over the greater portion of Central Africa. Enough is known to justify the supposition that from eighty to one hundred millions would not be an over estimate of the population cruelly oppressed and kept in hopeless barbarism by the tyranny and violence of comparatively small numbers of predatory and bloodthirsty tribes. If these could be held in check but for a short period, while peaceable influences had time to work among the better-disposed of the populations, there is every reason to believe that a sufficient number of these would soon be collected into communities and villages, able successfully to defend themselves and their possessions under European guidance. It is this prospect which has induced so many to risk not only health and fortune, but the perils of martyrdom; and with an object so important and worthy in view it is not likely that there will be any lack of volunteers ready to take the place of those who fall in the first advance. The instructions given to the Belgian Mission are eminently pacific—as the committee think they ought to be in every case in which an exploratory expedition is despatched—and are to the effect that in all operations the head of the party must remember that he is to have recourse to force only in self-defence, and at the last extremity. To this general principle must be added the instruction to pay for all they require—labour, food, stations, and, if need be, a right of way peaceably conceded. The Committee approve these rules, and are of opinion that nothing more is needed than the faithful adherence to such rules of action to justify the continued prosecution of exploratory work. Having considered the practicability of exploring the country between Mombas, Formosa Bay, or some point on that part of the coast and Victoria Nyanza, passing by Mount Kenia, to which the chief objections are the great cost (estimated at about 2500*l.* in two years) and the hostility of certain tribes in the district, the committee consider two alternative plans. The first, suggested by Mr. Stanley, is to examine the valley of the Rufiji from its delta to its sources in the highlands bounding the eastern side of Tanganyika; and the second is to explore the country beyond a caravan road now being made by English engineers under the sanction of the Sultan of Zanzibar, from Dar-es-Salaam (a few miles south of Zanzibar) towards the northern end of Lake Nyassa. According to the account given by Mr. Cotterill of the country through which this route will take a party, the region offers great attraction in the grandeur of its physical features, and is likely to yield discoveries of great geographical interest, independently of its practical importance in connection with the question of the best trade route to the lakes. Should the expedition reach Lake Nyassa, a distance of 350 miles from Dar-es-Salam, the position would serve as a starting-point for a more important exploration to the southern end of Lake Tanganyika, a further distance of 190 miles. The return journey might be made as as far as possible along the valley of the Rufiji. To open up the interior of Africa, the committee believe

that work of a steady and progressive character is required. It must not be too ambitious at first, nor beyond the real exigencies of trade and civilising efforts, to which geographical exploration is the pioneer. The Committee recommend, under the circumstances, the despatch of a small expedition, under the command of Mr. Keith Johnston, with whom another European is to be associated, to start from England in October next.

Mr. FRANCIS GALTON moved that the report be received, which was seconded by Captain CAMERON, R.N.

A brief discussion then followed, Sir RUTHERFORD ALCOCK explaining in conclusion the reasons the Committee had for recommending the Dar-es-Salam route. He thought that the best way of gaining the support of the public for the further prosecution of African exploration was to show that something was being accomplished, and if the present expedition were successfully carried out he thought it would facilitate African travel immensely. He proposed the following resolution:—"That, in the opinion of this meeting, the route recommended by the Exploration Committee is, under all the circumstances, the best to be adopted."

Sir HENRY RAWLINSON seconded the motion, and the resolution was carried unanimously.

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BERLIN GEOGRAPHICAL SOCIETY.

March 2nd, 1878.—Herr VON RICHTHOFEN, President, in the chair. Herr FREIHEN VON THIELMANN communicated a description of his ascent of Cotopaxi, for which he left Quito on the 12th January last, and arrived at the highest point of the mountain (5943 metres) at 9.45 a.m. on the morning of the 15th.

Herr R. KIEPERT read a paper on Colonel Prejevalsky's journey to Lob-Nor, which he has republished in the *Globus*.

Professor G. KARSTEN, from Kiel, presented the Society with the Annual Reports for 1874, 1875, and 1876, of the Committee for the Scientific Examination of the German Ocean. He explained that in 1871 and 1872 two expeditions were sent into the Baltic and German Ocean respectively for the purpose of making a complete physical examination of those seas, and so paving the way for a further investigation which was to be how to develop the economic wealth of the sea. To this end twenty observing stations were established, thirteen along the shore of the Eastern Ocean from Hela to Sonderborg and seven between Sylt and Borkum along the shore of the North Sea. These observations are intended to play the same part in reference to the Sea that meteorological observations do in regard to the atmosphere. At present special attention is being devoted to the herring, which forms an important item of food. One fact of importance has been brought to light in the course of these inquiries that the value of the Eastern Sea fishery is equal to the yield of a fertile tract of country from 80 to 192 German geographical square miles in extent.

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FRENCH GEOGRAPHICAL SOCIETY.

March 20th, 1878.—M. DE QUATREFAGES presiding. The PRESIDENT announced that Messrs. De Brazza and Ballay were expected at the West Coast of Africa about March. Announcement was also made of the completion of an Atlas of forty plans of Paris of all imaginable dates, with a prefatory memoir compiled by M. Engelhard. The Atlas will be exhibited at the forthcoming Exhibition. A letter from H.M. the King of the Belgians was read relative to the death of Messrs. Crespel and Maes, the Belgian African explorers, and the President announced that two officers had already come forward to take their places. Lieutenant Wyse wrote reporting his further explorations in the Isthmus of Darien, and M. LEVASSEUR read a paper on the distribution of population over the face of the globe. Taking the number of human beings on the face of the earth as about 1000 million, the average density is about 77 souls to every 1000 hectares, or very nearly 20 to the square mile. It is a peculiar fact, the lecturer pointed out, that in the old world the preponderance of population had gravitated towards the eastern and western extremities, viz. China on the one side and England, Germany, Belgium, and France on the other, while immense tracts between lay almost uninhabited. M. Levasseur enlarged on the process of settlements and migrations going on in the United States and the density of population there, this part of the lecture being illustrated by tinted maps.

The new Indo-Chinese Society presented some Arabic texts, and the Society of Bibliophiles, of Rouen, presented the fourth volume of *The Geography of the Seine-Inferieure Department*, devoted solely to the Neuchatel arrondissement.

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April 3rd, 1878.—M. DE QUATREFAGES in the chair. M. P. CAVE, lieutenant of the French navy, gave an account of a cruise round New Caledonia made by him. He started from Numea, which, for its security and dimensions, is the finest harbour of the colony, skirted the reefs on its western side, and which, by means of the openings in them afford access and harbourage to craft. There is a cobalt mine and some extensive copper mines in the island, the latter close to Balade Harbour, where Captain Cook first landed.

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General Meeting of April 7th, 1878.—The Baron DE LA RONCIERE LE NOURY, Vice-Admiral, President, in the chair. M. DUTREUIL DE RHINS, commanding the gunboat 'Scorpion,' in the service of the King of Annam, read a paper on the Annamese coast and the province of Hue. He estimates the superficial area of Annam at 97,000 square miles, and the length of the coast, without reckoning indentations, at about 1000 kilometres. Its population amounts to about two and a half millions, which gives about twenty-three inhabitants to the square kilometre. The shape of the country resembles a broad S, and it is separated from the western part of Indo-China, by a long range of mountains of varying height, the spurs of which in some cases run down to the sea. The speaker gave a description of the port of Turan, called by the Annamites Kuang-nam, and of the province of Hue, which, though of no great extent and in no sense as yet developed, contains unworked mines, forest products, and large cultivable tracts suitable for the growth of sugar, tobacco, cotton, coffee, &c. The climate offers a notable contrast to that of Lower Cochin China, and is by no means unhealthy, except at some points along the coast.

Dr. CREVAUX then gave an account of his recent travels in French Guiana, under the direction of the Minister of Instruction, to penetrate into the interior of the country as far as the chain of Tumuc-Humac. During this journey M. Crevaux explored twice as much ground as that sketched out in his programme. After having traversed the northern slope of the Tumuc-Humac chain he returned by the southern slope. The river Maroni conducted him to the foot of the mountains, which he explored from north to south, and the river Yary led him to the Amazon river. The crossing of the Tumuc-Humac chain was a most fatiguing undertaking, and M. Crevaux's supplies very nearly failed. Two of his companions, Messrs. Emonet and Krœnner, missionaries, were obliged to give up the journey after a month's experience thereof, and M. Crevaux had to continue his arduous exploration with one negro. He has traversed in all about 1500 miles, of which about 675 are over perfectly new ground.

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June 5th, 1878.—M. VIVIEN DE SAINT MARTIN in the chair. M. Savorgnan de Brazza writes to the Society under date Dume 25th July 1877, enclosing a letter from Dr. Ballay, who reported that he had ascended the Ogowe as far as the Pubava Falls, where it is between 60 and 70 feet across only. The falls themselves are about 130 feet in height and in two parts.

M. Duveyrier read a letter from M. Masqueray giving an account of some researches of his among the Abadia, a sect dwelling in the South of Arabia. Signor Guido Cora gave some particulars respecting the country about the Upper Nile now being explored by the Italian Expedition. M. l'Abbe Durand read a paper on Kashmir and Tibet.

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PARIS SOCIETY OF COMMERCIAL GEOGRAPHY.

May 31st, 1877.—Count MEYNERS D'ESTREY in the chair. M. ARDIN D'ELTEIL, vice-consul at Sierra Leone, read a paper on the rivers belonging to France on the western coast of Africa between Sierra Leone and the Gambia. Arrangements were then made for the organisation of a Congress of Commercial Geography to be held at the Trocadero during the current Exhibition.

In the 3rd Section or Committee of the Society M. le Général Robin read a paper on a proposal of M. Monnie's for colonising the valley of the Rio Colorado in South America. After a discussion the commission agreed to approve the scheme, as far as exploration was concerned, but not to recommend colonisation, as beyond the scope of the Society.

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LYONS GEOGRAPHICAL SOCIETY.

April 7th, 1878.—M. LOUIS DESGRAND, President, in the chair. M. De Semellé being unable to be present, M. FRANCOIS DELONCLE read in his stead a paper on the expedition of the former to Central Africa. A detailed account of M. de Semellé's scheme will be found at page 48 of our number for February last. To the particulars, therefore, M. Deloncle added that there were grounds for supposing that M. de Semellé would probably discover between 3° and 5° N. lat. a lake or series of lakes bearing the name of Tem, according to Admiral Fleuriot de Langle; Temten, according to Vogel; Demdem, according to the Arabs; and Sarabœ or Sarbewel, according to the Portuguese E. Lopez (1586). This lake, M. Deloncle thinks will be found to be the source of the Shari. It is calculated that M. de Semellé's expedition may last three years and cost 183,000 francs (7320*l.*)

M. DELONCLE then gave an account of the travels of a Franciscan monk through Africa during the fourteenth century. This monk's name is unknown, but he was born at Seville in 1305, and travelled over various parts of the globe. He visited Europe and Asia, including China, then journeyed into Egypt, explored the African coast of the Mediterranean, Marocco, Senegal, the Sudan, Guinea, the Cape de Verde islands, St. Thomas and Fernando Po, the region of the Shari and Lake Chad, the sources and course of the Nile, Darfur, Abyssinia, and Nubia. He describes the countries visited by him with great conscientiousness and gives the names of places where he stopped, as well as the history of such countries as he could ascertain. M. Deloncle concluded his paper with remarking that the researches of M. Marcos Ximenez de la Espada, member of the Madrid Geographical Society, and his own examination of this curious work above mentioned, would invest old records of travels and especially mediæval ones with a value which has somewhat undeservedly been denied to them hitherto. He exhorted his hearers to encourage researches into the archives of the principal cities of Europe with the object of unearthing fresh records of a similar character.

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IMPERIAL RUSSIAN GEOGRAPHICAL SOCIETY.

April 5th (*17th*), 1878.—M. P. DE SEMENOV, Vice-President, in the chair.

M. SREZNEVSKY, the Secretary, announced the return of Messrs. Potanin, Rafoilov, and Berezovsky from Mongolia. The expedition charged with the duty of examining the water-parting between the Ob and Yenisei left St. Petersburg on the 12th March. It consists of Baron Aminov, engineer, the chief of the expedition, and Messrs. Lipine and Porzel, to which party will be added an officer and some surveyors chosen by the Governor-Generals of Eastern and Western Siberia. Yeniseisk has been selected as the starting place of the operations from whence the expedition will make for the Ket, a tributary of the Ob, immediately after the melting of the river ice. The region to be explored is about 150 versts long. M. Smirzov, of the Kazan University, proposed to start on the 15th (27th) April for the basin of the Petchora, where he intends to make magnetic observations during the spring.

Two other projects have been approved by the Society, one of an ethnographical character in Russia in Europe, and the second of a purely geographical scope in Mongolia. Details were promised later on.

The publication of several works was announced. The second part of the third volume of the *Memoirs of the Section of Physical Geography*, including a paper by M. Oswal Heer, professor at Zurich on the flora of the jurassic strata of the Irkutzk Government and Amur country, with an introduction by M. Schmidt, the eighth volume of the *Memoirs of the Ethnographic Section*, which is devoted to customary law, and comprises researches into the manners and customs of the inhabitants of Samara, the Lapps, Samoyedes, Khirgizes, Yakuts, and others.

In conclusion, the Secretary drew attention to a remarkable work presented to the Society by M. Hovert, who has catalogued all the works, pamphlets, documents, &c., of the St. Petersburg archives having reference to the geography of Russia. This exhaustive catalogue has been deposited in the Society's library for convenience of reference.

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May 3rd, 1878.—M. P. de SEMENOV, Vice-President, in the chair.

The SECRETARY read his monthly chronicle of events. He touched upon Colonel Prejevalsky's approaching return to St. Petersburg (see our last number, p. 162), and mentioned that he had made natural history collections during his stay at Zaissan. Intelligence had been received of the arrival of the Baron Aminov, at Yeniseisk. M. S. Smirnov, who, with M. Middendorf, is studdying the agriculture of Russian Turkestan, wrote and gave information regarding their movements, and M. J. Smirnov, Professor at the Kazan University, reported the commencement of his magnetic observations in the Petchora country, which will complete the series of observations of a similar character which he has been making for the last seven years in various parts of Russia. M. Poliakov proposes to continue his researches commenced in 1867, into the remains of the stone age. His previous labours have been in the Irkut valley, in the province of Olonetz, in the upper part of the Volga and in the Ob valley, and this season he will visit the government of Vladimir and Esthonia, where various pre-historic remains have been recently unearthed, including interesting proof of the contemporaneous existence of a fresh-water seal and the mammoth.

M. Tiaguine, of the Pilot service, chief of the station founded in Novaya Zemlya, by the Society for the Saving of Life at Sea, has been furnished, by the Society, with adequate means for taking scientific observations, during his sojourn in that Arctic Station. Announcement was made that Sub-Lieutenant Oscar Nordquist

had arranged with Professor Nordenskiold to accompany the latter in his Arctic voyage to the Siberian Polar Sea, in the ship 'Vega,' and had been furnished by the Society with instructions to keep a journal and carry on scientific observations. M. Mouskelof proposes to make a geological examination of the southern part of the Tian Shan mountains, the northern part of which he had already explored in 1875.

M. POTANIN gave an account of his travels in Mongolia. He observed that the eastern part of the Altai was first reconnoitred in 1869, by the Boundary Demarcation Commission, and that further information was acquired by Messrs. Matussovsky and Sosnovsky. The existence of a lofty chain of mountains as far as the meridian of Kobdo was known; beyond that point, mountains of lesser height were supposed to extend, and (according to Klaproth) to unite with the Tian Shan. In order to solve this point the expedition made an excursion southward as far as Hami; it ascertained that the Altai range extends eastward of Kobdo, and that it is separated from the Tian Shan by the Gobi depression. According to native information, the Altai extends as far eastward as the longitude of Orok-Nor, and is bounded on the south by the Gobi. The eastern part of the Mongolian range presents three features of note: the main mass of the mountains has the character of a continuous plateau without culminating summits; its passes, the lowest of which is 8000 feet, are separated by deep ravines; and the western part is of a different character. The Altai separates from each other the three plateaux of Zaissan, Jabkhin, Khirgiz, Nor, and the Gobi. The Tian Shan consists of two parallel chains. The Hanghoi range, when the expedition visited it, on the south, is separated from the Altai by the great Jabkhin valley. Eastward no mountains were to be seen, but certain data led them to think that the Altai and Hanghoi are probably joined. Detailed topographical information was given by M. Potanin, regarding that portion of the great Altai range north and south-east of Uliassutai. He remarked that it is only in its north-western portion that it is at all well watered, all the other parts being arid; larch and fir forests are found in the western valleys, and in three places on the northern slope, and the cedar is said to exist on the Hanghoi or Kangai range, which extends to the south of the Tes river. M. Potanin also gave details of the population of the different tracts in this region.

We have no hesitation in saying that M. Potanin's map will form a very important contribution to the geography of Mongolia.

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HALLE GEOGRAPHICAL SOCIETY.

May 8th, 1878.—Dr. KIRCHHOFF, President, in the chair. The PRESIDENT spoke of the recent organisation of the German African Society, and of the intended journey of Herr Schütt, an engineer, into Muata-Yanvo's kingdom (already partly known to us through Dr. Pogge's travels), and from thence northward into the region lying between Stanley and Cameron's routes, whither it is hoped that it may be found possible to despatch an expedition from the north through the countries traversed by Nachtigal and Rohlfs. Reference was then made by the President to the fiftieth anniversary of the foundation of the Berlin Geographical Society, and the proposed union of several German societies was reserved for future consideration and discussion.

Professor Dr. HERTZBERG read a paper on the old and new conditions of the Balkan peninsula. He pointed out how the upheaval of the shores of the Ægean Sea and the alluvial deposits of the rivers had reclaimed considerable tracts and altered the configuration of the country. Miletus, once an important port, is now a miserable inland village; and the pass of Thermopylæ, which formerly was defended by a handful of men against a host, owing to the narrowness of the pass between the steep face of the mountains and the maritime swamps, has now widened to the extent of a mile seawards. Earthquakes, too, have helped to make the face of the country very different from what it was. The vegetation and fauna of the country have also undergone change: whole groves of orange trees now extend as far as Epirus; the lion has disappeared from Thessaly, and the cat has been introduced. Of the superior indigenous breeds of Thessalian horses there is now no trace. Regarding the ethnological changes, the author pointed out that the Islamite and Greek religions had made many converts of people, and even races, whose origin was far different from what their religion would have denoted. The term "Greek" is often applied at this day to people who are nothing but Græcised Bulgarians. Topographical investigations have done much to dissipate false notions of the country. The Acroceraunian mountains, once regarded as a long dividing range between Epirus and Illyria, have shrunk to the dimensions of a short mountain range. The Balkan, with its eighteen passes, can obviously form no important line of ethnological demarcation. The openings in the mountains north-east and north of Macedonia, which made her so exposed on that quarter, explain much in her history.

A discussion ensued, in which Professor VON FRITSCH and JELLINGHAUS related their own experiences in the countries referred to.

We regret that in our May number Dr. Nachtigal's paper, read before the Halle Society in April, should have been erroneously described as having been read at the January meeting. The mistake occurred through the omission of any date on the "slip" of the meeting.

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ITALIAN GEOGRAPHICAL SOCIETY.

April 22nd, 1878.—SIGNOR MALVANO, Vice-President, in the chair. The MARCHESE DORIA read a paper on the work of the Italian Naturalists in New Guinea, and prefixed to it a brief account of former and subsequent notable voyages to that island. The Marchese expressed a hope that Signor D'Albertis would be awarded the Gold Medal of the Society, and he observed that the collections of Beccari and D'Albertis combined with those made at the instance of M. Bruijn by M. Laglaize, a Frenchman, among the Karon people on the north coast, together amounts to 800 specimens of mammalia, 10,000 birds, 3000 reptiles, 2000 fish, 80,000 insects, &c. All these have passed through the Marchese Doria's hands and are now in the Civic Museum of Genoa. These are exclusive of the last collections made on the Fly river by Signor D'Albertis.

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